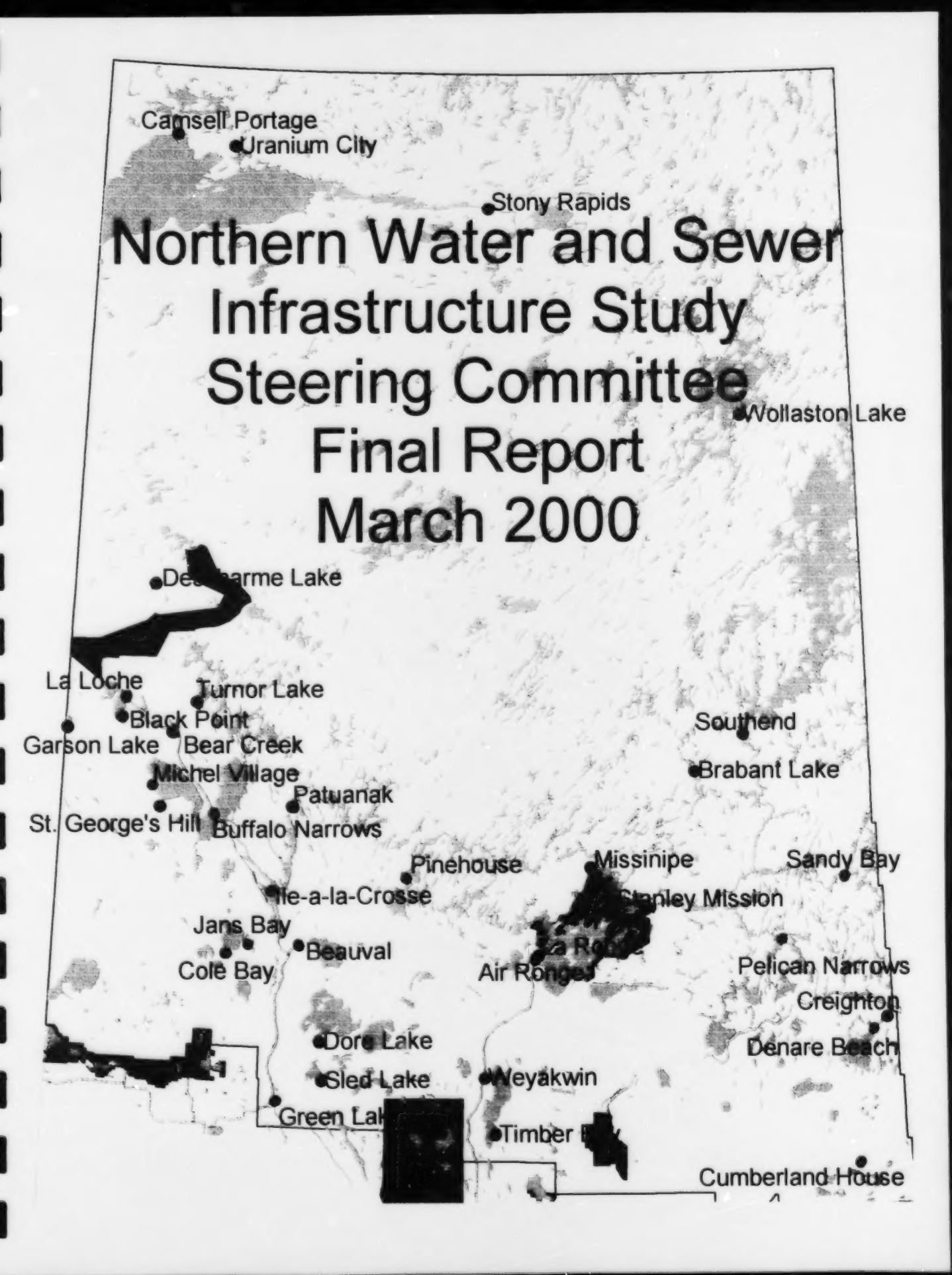
Camsell Portage
Uranium City
Stony Rapids
Northern Water and Sewer
Infrastructure Study
Steering Committee
Final Report
March 2000
Wollaston Lake
La Loche
Turnor Lake
Black Point
Garson Lake
Bear Creek
Michel Village
Patuanak
St. George's Hill
Buffalo Narrows
Southend
Brabant Lake
Pinehouse
Missinipe
Sandy Bay
Ile-a-la-Crosse
Stanley Mission
Jans Bay
Beauval
Cole Bay
Air Ronge
Pelican Narrows
Creighton
Denare Beach
Dore Lake
Sled Lake
Weyakwin
Green Lake
Timber Bay
Cumberland House

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Executive Summary

Overview

Municipal Affairs, Culture and Housing in cooperation with New North, undertook the preparation of an objective study of the current, and probable future, water and sewer infrastructure needs in the 35 northern communities. A project steering committee made up of six representatives from New North, and officials from Municipal Affairs, Culture and Housing, Sask Water, the Office of Northern Affairs, Health and Economic and Co-operative Development, was established to oversee the project.

The purpose of the study was to:

- develop objective criteria for prioritizing identified water and sewer improvements and projects on an equitable basis;
- assess the capacity and condition of existing water and sewer infrastructure in northern municipalities and estimate the costs to operate, maintain and replace the existing works;
- assess the current and future water and sewer needs of northern municipalities and estimate the costs of meeting those needs;
- determine whether alternative, non-conventional water and sewer infrastructure systems are a better solution for the needs of smaller communities; and
- provide recommendations on the priority of water and sewer infrastructure improvement projects within and between northern municipalities, based on the objective criteria.

The committee engaged a consultant, Associated Engineering/UMA, to develop the objective criteria and prepare individual reports on each of the 35 northern communities identifying deficiencies in the water and sewer systems and recommending projects to bring the systems up to provincial standards.

The Consultant's Findings

One municipality and eight northern settlements have no public drinking water or sewer services. People must get their drinking water from untreated central wells or surface sources and dispose of their waste in pit privies.

In many of the 26 communities with services, the municipal systems are in serious need of replacement or upgrading in order to provide safe and secure water supply and environmentally acceptable methods of waste disposal. The reports identified over 175 projects as being needed over the next 20 years. Almost 150 of these projects are needed within the next 5 years to ensure the systems comply with provincial standards.

Estimated costs to bring the systems up to current standards are $25 million. The projected cost for developing and upgrading the water and sewer systems in the communities over the next twenty years is almost $50 million.

The Steering Committee Report

The steering committee reviewed the consultant's reports and developed a prioritized list of projects that will:

- Provide basic services to all the currently unserviced communities within 2 years, and
- Ensure that all serviced communities' systems meet provincial standards within five years.

The committee has also made recommendations with regard to:

- Development of a program for funding the works as well as their ongoing operation and maintenance,
- Development of a training program for water and sewer system operators,
- Upgrading of non-modern houses in the communities, and
- Development of a program for new subdivisions in the communities.

Summary of Recommendations

The committee has recommended that:

Prioritization

1. northern communities' water and sewer infrastructure be brought up to acceptable standards as soon as possible, preferably within five years.
2. projects be undertaken following the prioritized list focusing first on providing basic services to all unserviced communities within the first two years, subject to the availability of funding and local communities' priorities.

Funding

3. the province make a five-year commitment of funding to the Northern Revenue Sharing Trust Account (NRSTA) to assist with the construction of the required water and sewer infrastructure works, with funding allocated on an annual basis.
4. the funding formula developed for a water and sewer infrastructure program recognize that analysis as part of the study confirmed that local communities have very limited fiscal capacity to contribute to the costs of the needed works and face both other capital needs and population growth.
5. in the event new federal funding for infrastructure development becomes available, the following options should be considered for use of the added federal money: a) accelerate the program of upgrading the water and sewer infrastructure in the communities (to be completed in less than 5 years), or b) change the funding formula with respect to contributions from the partners (province, NRSTA and municipalities), allocating any savings to other infrastructure needs in the northern communities.

6. local governments be given the opportunity to review and approve water and sewer project progress reports before progress payments are made.

Operating and Maintenance costs

7. communities establish a fee schedule for provision of water and sewer services that recognizes the cost to the community of providing the service as well as the ability of the residents to pay for the service.

8. as soon as unserviced communities have water and sewer services installed, the NRSTA management board apply the existing funding formula allowing increases to operating grants to assist with defraying added operating and maintenance costs.

Training and System Operation

9. the Northern Saskatchewan Administration District (NSAD) obtain engineering services to oversee operation and maintenance of the water and sewer systems, particularly in the northern settlements.

10. communities have trained operators available for the operation and maintenance of the water and sewer systems, and that a program be put in place to train and support these operators.

Housing Connections and Upgrades

11. communities pass bylaws requiring all occupied buildings in the community that abut the services to be connected to the system.

12. where holding tanks or cisterns are supplied, these houses be required to connect to them.

13. Municipal Affairs, Culture and Housing (including Saskatchewan Housing Corporation) work with the NRSTA management board, the health districts, Social Services, communities and residents to develop a program to upgrade the non-modern houses. For example, the Residential Rehabilitation Assistance Program (RRAP) could be expanded or enhanced.

Electrical Power

14. Sask Power be encouraged to upgrade its infrastructure to provide more reliable electrical services. In the interim it will be important for the communities to ensure that backup systems are in place to protect water and sewer equipment and services.

Subdivision Design and Development

15. communities update existing or adopt new community plans which outline the community's need for lots and identify areas that are suitable for development, along with time frames and costs of developing those areas.

16. land use plans be developed to guide future residential developments in the unincorporated areas of the NSAD. Development should be directed to locate in areas where services are available.

17. the type of water and sewer services to be provided in new subdivisions be considered during the design of the subdivision. Where larger lots are desired, the community must make it clear to purchasers that piped water and sewer services will not be provided.

18. the province and the NRSTA management board review program criteria relating to the funding of subdivision development. An agreement should be entered into identifying funding available for subdivision projects in the north for the next five years once water and sewer infrastructure needs have been provided for.

1. BACKGROUND

Municipal Affairs, Culture and Housing, in cooperation with New North, contracted for a study to determine the water and sewer infrastructure needs of the 35 northern communities. The study was needed to update and consolidate the information on the condition of the water and sewer infrastructure in the communities.

Steering Committee

The Steering Committee established to oversee the project consists of six representatives of the provincial government and six representatives from the northern communities.

Government representatives are:

Dr. Brij Mathur, Associate Deputy Minister, Saskatchewan Municipal Affairs, Culture and Housing, Chairing the committee;

Ms. Peggy Clark, Executive Director, Saskatchewan Municipal Affairs, Culture and Housing (replaced by Paul Raths);

Ms. Carol Rowlett, Program Liaison Co-ordinator, Office of Northern Affairs;

Ms. Kathy Chisholm, Executive Director, Northern Health Services;

Mr. Glen Gillis, Area Engineer, SaskWater Corporation; and

Mr. Dave McQuinn, A/Executive Director, Economic and Cooperative Development.

Northern community representatives are:

Mr. Sandy Rediron, Mayor, Northern Village of Beauval;

Mr. Ernest Sylvestre, Mayor, Northern Hamlet of Michel Village;

Mr. Kevin Herman, Chairman, Northern Settlement of Bear Creek

Ms. Joan MacDonald, Mayor, Northern Hamlet of Stony Rapids;

Ms. Bev Wheeler, Administrator, Town of Creighton (Mr. Wilf Boychuk, Mayor, Town of Creighton attended in place); and

Mr. John Wade, Administrator, Town of La Ronge;

Representatives from New North also participating on the Committee include:

Mr. Max Morin, Mayor, Northern Village of Ile a la Crosse and Co-Chair of New North, and

Mr. Paul Daigneault, Director, New North

The consultant hired to conduct the study was a joint effort of two engineering firms based out of Saskatoon:

Associated Engineering Ltd. (Bert Munro) and UMA Engineering Ltd. (Don George)

The project manager is Mr. Randy Braaten, Regional Manager, Municipal Affairs, Culture and Housing.

The study looked at the 35 communities (2 towns, 13 villages, 9 hamlets and 11 settlements) in the Northern Saskatchewan Administration District (NSAD). These communities range in population from 40 to 2,750. The level of water and sewer services ranges from none, in most of the settlements, to complete systems in other municipalities. There has been strong population growth in many of the northern municipalities, which has increased the demands on the water and sewer systems.

1.1 Study Objectives

(a) Infrastructure Analysis

The purposes of the infrastructure study were to:

- develop objective criteria for prioritizing identified water and sewer improvements and projects on an equitable basis;
- assess the capacity and condition of existing water and sewer infrastructure in northern municipalities and estimate the costs to operate, maintain and replace the existing works;
- assess the current and future water and sewer needs of northern municipalities and estimate the costs of meeting those needs;
- determine whether alternative, non-conventional water and sewer infrastructure systems are a better solution for the needs of smaller communities; and
- provide recommendations on the priority of water and sewer infrastructure improvement projects within and between northern municipalities, based on the objective criteria.

(b) Project Priorities

The study was to provide recommendations on the priority of water and sewer infrastructure improvement projects within, and among northern communities. The consultant ranked the priority of needs according to the criteria developed in consultation with the Steering Committee.

In developing objective criteria, the committee recognized that there were differences between those communities with existing water and sewer services and those without. The decision was made to separate the two types in order to establish more relevant and consistent criteria for ranking needs.

The study did not review the infrastructure needs of the sixteen Recreation Subdivisions in the NSAD, and they are not included as part of this review or recommendations.

While the report considers the costs of expanding system components such as water treatment plants and sewage treatment facilities to accommodate the future population increases, the report does not consider the capital costs of extending servicing to new subdivisions.

1.2 Project Overview

The consultant's portion of the study began in September 1998 and was completed in June 1999. The work undertaken was:

a) to develop objective criteria for evaluation of infrastructure improvements;

b) to inventory the existing water and sewer infrastructure and an estimate of its replacement cost;

c) for communities without existing water and sewer systems, to recommend what basic water and sewer infrastructure should exist to meet the health and safety requirements of residents, including an estimate of the cost of developing the infrastructure;

d) to assess the need for upgrading and repair of existing water and sewer infrastructure needed to maintain existing levels of service, and where appropriate, to bring the levels of service up to provincial standards, over the next five years;

e) to assess the need to expand or enhance water and sewer infrastructure to meet projected 20 year community growth, including an estimate, as to what costs may be incurred to meet provincial standards for particular elements of infrastructure;

f) to identify optional methods (conventional and non-conventional) for the delivery of potable water and the disposal of waste, taking into consideration each community's fiscal capacity, physical patterns of development, climate and physical environment; and

g) to apply the objective criteria and rank the priority of water and sewer improvement projects.

The consultant undertook a review of existing reports and studies as well as field inspections and interviews with community staff.

Population growth for the communities was projected for 20 years, and the design capacities of the systems were based on this population.

Northern Municipal Services supplied information on the financial capacity of the communities to help determine a community's ability to fund capital works and pay for operation and maintenance of the systems.

Treaty Land Entitlement (TLE) communities and communities where systems are shared with adjoining First Nations reserves presented special issues to address in the study.

Stony Rapids and Cumberland House also had unique circumstances that needed to be addressed. In some cases, possible problems were noted that were outside the terms of reference of the study. In these cases, additional, specific studies are needed to determine the extent of the problem. The study, however, did identify possible cost implications related to these areas.

The steering committee identified a strong need to have people trained and knowledgeable about the operation and maintenance of the systems to ensure they are properly run. In addition, there is a need for communities to develop a capital works budget for the maintenance of the systems.

1.3 Objective Criteria

The terms of reference anticipated a high level of need for improvements or expansion to the water and sewer systems, and limited resources to pay for the needed work. The development of an objective and fair method of ranking the projects was needed to enable development of a prioritized list of projects.

The objective criteria developed and used by the consultant were:

a) the required capacity of the community's water and sewer systems compared to existing capacity of the system based on current population and demand,

b) the tested water quality as compared to quality guidelines. Both health and aesthetic factors were considered with health factors being weighted higher,

c) the condition of the systems based on incidences of required repair, and

d) the population served by the system.

2. UNSERVICED COMMUNITIES

2.1 Overview

The eight settlements and one hamlet in this group have very minimal or nonexistent water and sewer services. Many residents still haul water by pail from surface water bodies or from community wells.

All communities have a water source, either a community well or access to surface water. There is some treatment in the communities, except for Camsell Portage and Brabant Lake. Stony Rapids has a surface water intake and treatment but the system serves a very limited part of the community. Quality also varies, generally depending on the source. Surface water sources tend to need more treatment than ground water sources. Distribution is mainly by pail fill or truck delivery, although Sled Lake has a small diameter piped system with very limited capacity, and the Stony Rapids system serves a very limited area. None of the communities have water storage capacity.

The lack of a safe, secure water supply impacts on the health of residents in these communities. There are reports of residents experiencing health problems as a result of no potable water for drinking and washing.

Use of pit privies is common. There are over 100 houses that lack plumbing. Since all these communities are near water bodies, this creates a high potential for contamination. This is a major concern where the water body is also used as a source of drinking water.

Stony Rapids, Brabant Lake and Sled Lake have sewage lagoons. Southend has access to the lagoon on the adjoining reserve. None of the other communities have any easy access to disposal and treatment facilities. None have a piped collection system.

2.2 Consultant Recommendations

The consultant has recommended that conventional water and sewer systems be installed in all communities except Bear Creek for which a low pressure water system was recommended. The conventional system meets provincial standards and guidelines.

Water storage ranks high in the needs of most of the unserviced communities since there is currently no storage capacity.

While conventional systems are initially more expensive to install, over the long term, they have lower operating and maintenance (O&M) costs.

2.3 Committee Recommendations

The small population of most of these communities combined with a low level of development scattered over a relatively large area in most unserviced communities makes provision of conventional systems expensive on a per lot basis. The difference in cost of installing a conventional system compared to a truck haul system averages $450,000. The O&M cost savings of the conventional system average about $25,000 per year, for a cost recovery period of 18 years. This varies by community and in some cases the added costs can be recovered in as little as 4 to 5 years.

In addition, conventional systems require trained operators to keep the systems functioning. The community should have a main operator, along with a backup or standby person. In some communities finding people to operate the system may be difficult. Training of the operators is also a critical issue.

The design of many of the communities, with larger lots and well separated buildings, does not lend itself easily to installation of conventional systems. Future subdivision designs in these communities must recognize the level of services that exist or will be available.

While a conventional system also provides fire protection, many of the communities lack fire fighting equipment or trained fire fighters. Other options for fire protection can be reviewed in these communities. Discussions with local communities have indicated that alternative methods of providing water and sewer services are acceptable. (See Appendix 2 for a discussion of alternative systems.)

In these cases the steering committee recommends that truck haul systems (which include water treatment, sewage lagoon, holding tanks and cisterns) be installed in Black Point, Bear Creek, Brabant Lake, Descharme Lake and Garson Lake for the immediate future. If development increases in these communities, these systems can be expanded to low pressure water/sewer. (See Appendix 1 for a discussion on each community.)

Installation of conventional systems is recommended for Stony Rapids and Sled Lake. Stony Rapids has a larger population on conventional sized lot subdivisions. In Sled Lake the existing 50 mm water line needs to be replaced, and for sewer, the cost between a low-pressure sewer system and a conventional sewer system is not significant. (See Appendix 1 for discussion on each specific community.)

Camsell Portage also presents special circumstances due to isolation and terrain constraints. The committee feels more information is needed before a final decision is made on the best type of system for Camsell Portage. In the interim, the most critical issue is providing improved water for the residents and finding an acceptable means of sanitary sewage disposal. Based on discussions with the local advisory committee, individual sand point wells may be workable, but given water quality, a community well with treatment is preferable. Until a suitable method of sewage disposal is determined, considering the unique location of the community, the local advisory committee has asked for composting toilets. (The issues in Camsell Portage are discussed in more detail in Appendix 1.)

Thirty-five projects are identified as needed to bring an acceptable level of services to the nine communities. The current estimated capital cost of putting water and sewer in these communities is $11.1 million.

2.4 Prioritization

The provision of potable drinking water is identified by the consultant's report, as being important for health. A secure source of potable drinking water is the highest priority in order to maintain the health of the residents. A community that depends solely on an

untreated surface water supply would rank higher in terms of priority than a community with an existing community well. Communities with poor water quality or supply rank higher as well. Population at risk from inadequate water and sewer systems was a third factor in determining priorities.

The prioritization of projects for unserviced communities is based on the consultant's ranking of the communities based on the objective criteria. The community ranking from the consultant is:

Community	Rank
Stony Rapids	1
Brabant Lake	2
Sled Lake	3
Southend	4
Camsell Portage	5
Black Point	6
Bear Creek	7
Descharme Lake	8
Garson Lake	9

Within this ranking, prioritization of the projects was based on the following sequence and needs:

1. Ensuring community residents have access to a safe and secure water supply of a good quality is the first priority. In this regard, projects involving construction of water supplies and treatment in those communities without a good water source, or safe water, were of the highest priority.

2. Once an acceptable water supply is established, suitable methods of sewage treatment and collection are needed.

3. Following this, improvements to water distribution methods can be developed.

In the committee's prioritization, Southend's ranking was influenced by the significant TLE impact on the community. Infrastructure development in Southend will be highly dependent on INAC's project schedule for expansion of the reserve water and sewer system.

2.5 Results

As a result of completion of the initial phases of the projects, all communities without services will have systems which meet minimum acceptable standards for water supply and sewage disposal.

3. SERVICED COMMUNITIES

3.1 Overview

The study reviewed the capacity and needs of 26 serviced communities. Not all of these have full water and sewer services. Dore Lake has a pumpout septic system, and Timber Bay has a low pressure sewer system. Some of the communities also have small diameter water mains in all, or portions of the community. This affects water distribution and fire fighting capability.

A secure, potable water supply is the most important element for residents' health, therefore problems with water supply and distribution would be the most critical to address. Other elements of the water system such as water storage, emergency pumping and fire hydrants are also addressed.

The projects identified by the consultant as being needed fall into six main areas:

1. Systems that are under capacity based on current demand (the population in the community is larger than the design population of the system). In these cases, expansion of the system is needed to bring the system up to a level where it can meet the existing needs of the residents.

2. Systems that have adequate capacity for current, or future needs, but are in need of significant repairs in order to maintain the capability to provide services. Without these repairs the systems will break down in the near future.

3. Systems with adequate capacity for current demand, that will continue to function. However repairs or upgrading to the system are needed to meet emergency needs or safety issues. Examples would be the addition of gas fired pumps or power generators to the systems.

4. Minor repairs to the system that are not critical but which serve to maintain the system. This is generally basic operating and maintenance work, which the municipality should do on a regular basis.

5. Upgrading or replacing an existing system with another system, even though the existing system has adequate capacity to meet the community needs. Examples would include replacing 100 mm water mains with 150 mm mains to improve flows for fire protection, or replacing a holding tank system with a piped sewer collection system.

6. Studies required to obtain more detailed information on water or sewer systems. The added research, such as pressure testing and camera work, was beyond the scope of the current study. In some cases these studies will affect future costs based on problems identified. The projected costs in the study do anticipate some of these projects, but additional information is needed to determine the extent of the work needed.

3.2 Recommendations

The consultant identified 104 projects as being needed in the serviced communities to bring the systems up to current standards and guidelines. The estimated cost of these projects is $13.7 million. The cost of the individual projects ranges from $5,000 to $1.2 million.

Over the 20 year time period the study looked at, the total cost of projects is projected at $33.2 million based on current community growth and development.

3.3 Prioritization

In ranking the required projects across the serviced communities, the prioritization was based on the following three factors:

1. community rank from consultant's report,
2. the year in which the consultant notes the project as will be needed (1, 5, 10, 20), and
3. the project type (water, sewer, repair, study) with water being considered as most critical.

For example, a water upgrading project needed in year 1 in a highly ranked community would place higher than a sewer project.

3.4 Results

Completion of the projects identified will bring the water and sewer systems in all the serviced communities up to current provincial standards.

4. PRIORITIZATION

The serviced and unserviced communities were considered separately in developing the objective criteria, and separate prioritized lists were developed for each type. However, in developing a schedule of projects there was a need to recombine the priorities into a single list.

Ideally, all projects required to bring the communities' systems up to current standards should be done in year 1. However, as the total estimated costs of this work would be $20.2 million (not including INAC costs), the committee recognizes that it is not realistic to achieve this. Many of the projects are critical to ensure that the communities have a reliable source of water and safe methods of sewage disposal, and need to be completed as soon as possible. The committee recommends that these critical projects be completed in no more than five years. In addition, due to the critical need, some the program for improvements needs to be weighted towards the first years of the program.

Recommendation 1:

The committee recommends that the northern communities' water and sewer infrastructure be brought up to acceptable standards as soon as possible, preferably within five years.

The prioritized list below shows the order in which the committee recommends the projects be done. Years or phases are shown for illustration only since it is recognized that the timing of projects will depend on factors such as availability of funding and contractors. In cases where the system is a joint system with an adjoining Indian reserve, the availability of federal funding will be a factor in determining when the project proceeds. The ability of the local community to assist in financing the project will also influence when projects proceed.

Recommendation 2:

The committee recommends that the projects be undertaken following the prioritized list focusing first on providing basic services to all unserviced communities within the first two years, subject to the availability of funding and local communities' priorities.

The phases, along with the reason for inclusion of those projects in that phase, are summarized below.

1. **Phase 1 (2000-2001)**

Unserviced communities –Dependable water systems will be provided to those communities currently lacking systems. This is most critical from a health standpoint.

Serviced communities –Water systems that are under capacity or are failing will be expanded or repaired.

Results – All unserviced communities will have access to a dependable source of safe water. Water systems in serviced communities will be able to supply residents with water in a dependable manner.

Estimated total costs (not including INAC share for joint systems) - $7.6 million.

2. **Phase 2 (2001-2002)**

Unserviced communities – Completion of remaining water supply upgrading in unserviced communities and development or improvement of sewage collection/treatment systems (construction of lagoons, holding tanks).

Serviced communities - Addition of enhanced safety features to water systems, start of repair to critical components of sewer systems. More detailed studies on needs in certain communities.

Results – All unserviced communities will have acceptable methods of water supply and sewage disposal and collection. Serviced communities will have improved safety in terms of water supply and sewage disposal. Additional projects may be identified by new studies.

Estimated total costs (not including INAC share for joint systems) - $5.8 million.

3. Phase 3 (2002-2003)

Serviced communities – Water distribution improvements, sewer collection systems upgrades, system maintenance, additional studies will take place.

Results - Systems in serviced communities will be upgraded and repaired to current standards.

Estimated total costs (not include INAC share for joint systems) - $2.4 million.

4. Phase 4 (2003-2004)

Serviced communities – Water supply and distribution improvements to meet five year growth projections, addition of some safety enhancements.

Results – Improved and upgraded levels of services.

Estimated total costs (not including INAC share for joint systems) - $2.3 million.

5. Phase 5 (2004-2005)

Serviced communities – Additional expansion of systems to meet anticipated growth, includes projects identified by the study as being needed in five years, some additional improvements such as fire hydrants, emergency pumps, service and repair.

Result – Systems expanded to accommodate anticpated growth in the communities.

Estimated total costs (not including INAC share for joint systems) - $2.1 million.

Combined Prioritized List

TABLE 1 Combined List of Water and Sewer Projects by Year

Rank	Community	Project	Total Cost	Provincial/NRSTA Local Cost	Year
1	**Stony Rapids**	Sewage Collection	$1,400,000	$1,400,000	2000-2001
2	**Stony Rapids**	Water Distribution Mains	$1,100,000	$1,100,000	2000-2001
3	**Stony Rapids**	Water Supply/Treatment Plant	$940,000	$940,000	2000-2001
4	**Black Point**	New well	$20,000	$20,000	2000-2001
5	**Brabant Lake**	Water Supply/Treatment Plant	$480,000	$480,000	2000-2001
6	**Sled Lake**	Water Supply/Treatment Plant	$480,000	$480,000	2000-2001
7	**Camsell Portage**	Water Supply Improvements	$50,000	$50,000	2000-2001
8	**Descharme Lake**	Water Supply Improvements	$20,000	$20,000	2000-2001
9	La Ronge	WTP Booster Stn. Upgrade	$900,000	$900,000	2000-2001
10	La Ronge	Water Storage Expansion (Booster)	$800,000	$800,000	2000-2001
11	La Loche	Water Distribution Pumps	$25,000	$25,000	2000-2001

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TABLE 1		Combined List of Water and Sewer Projects by Year			
Rank	Community	Project	Total Cost	Provincial/NRSTA Local Cost	Year
12	Creighton	Water Supply Improvements	$50,000	$50,000	2000-2001
13	Ile a la Crosse	Water Distribution Pumps	$40,000	$40,000	2000-2001
14	Stanley Mission*	Distribution Pumping	$100,000	$11,000	2000-2001
15	Cumberland House	Water Distribution Mains	$1,200,000	$1,200,000	2000-2001
16	Cumberland House	Water Supply Improvements	$50,000	$50,000	2000-2001
17	Turnor Lake*	Distribution Pumping	$10,000	$6,000	2000-2001
18	Otter Lake*	New Well	$50,000	$50,000	2000
19	**Sled Lake**	Sewage Lagoon Expansion	$80,000	$80,000	2001-2002
20	**Camsell Portage**	Water Treatment Plant	$450,000	$450,000	2001-2002
21	**Black Point**	Septic Tanks	$140,000	$140,000	2001-2002
22	**Brabant Lake**	Sewage Lagoon Repairs	$25,000	$25,000	2001-2002
23	**Black Point**	Water Treatment Plant	$350,000	$350,000	2001-2002
24	**Black Point**	Sewage Lagoon	$70,000	$70,000	2001-2002
25	**Bear Creek**	Septic Tanks	$90,000	$90,000	2001-2002
26	**Bear Creek**	Sewage Lagoon	$70,000	$70,000	2001-2002
27	**Descharme Lake**	Septic Tanks	$150,000	$150,000	2001-2002
28	**Descharme Lake**	Sewage Lagoon	$60,000	$60,000	2001-2002
29	**Garson Lake**	Water Treatment Plant	$350,000	$350,000	2001-2002
30	**Garson Lake**	Septic Tanks	$160,000	$160,000	2001-2002
31	**Garson Lake**	Sewage Lagoon	$60,000	$60,000	2001-2002
32	**Sled Lake**	Water Distribution Mains	$230,000	$230,000	2001-2002
33	**Sled Lake**	Sewer Collection Piping	$350,000	$350,000	2001-2002
34	**Southend***	Sewage Treatment	$1,000,000	$10,000	2001-2002
35	**Southend***	Water Distribution Mains	$295,000	$2,950	2001-2002
36	**Southend***	Water Treatment Plant	$600,000	$6,000	2001-2002
37	**Southend***	Water Supply Improvements	$50,000	$500	2001-2002
38	**Southend***	Sewage Collection	$860,000	$8,600	2001-2002
39	**Camsell Portage**	Composting Toilets	$17,000	$17,000	2001-2002
40	**Black Point**	Cisterns	$140,000	$140,000	2001-2002
41	**Bear Creek**	Cisterns	$90,000	$90,000	2001-2002
42	**Bear Creek**	Water Treatment Plant	$350,000	$350,000	2001-2002
43	**Descharme Lake**	Cisterns	$150,000	$150,000	2001-2002
44	**Descharme Lake**	Water Treatment Plant	$350,000	$350,000	2001-2002
45	**Garson Lake**	Water Cisterns	$160,000	$160,000	2001-2002
46	Pinehouse	Distribution Pumping	$100,000	$100,000	2001-2002
47	La Loche	Water Storage Expansion	$75,000	$75,000	2001-2002
48	La Loche	Sewage Lagoon	$20,000	$20,000	2001-2002
49	Air Ronge*	Sewer Study	$30,000	$10,200	2001-2002
50	Air Ronge*	SPS Upgrades (#3)	$50,000	$50,000	2001-2002
51	La Ronge	Water Storage Expansion (WTP)	$250,000	$250,000	2001-2002
52	La Ronge	Water Distribution Study	$30,000	$30,000	2001-2002
53	La Ronge	Sewer Study	$30,000	$30,000	2001-2002
54	Creighton	Water Distribution Study	$30,000	$30,000	2001-2002
55	Creighton	Sewer Line Study	$30,000	$30,000	2001-2002

TABLE 1 Combined List of Water and Sewer Projects by Year					
Rank	Community	Project	Total Cost	Provincial/NRSTA Local Cost	Year
56	Ile a la Crosse	Fire Hydrants	$5,000	$5,000	2001-2002
57	Buffalo Narrows	Water Storage Expansion	$400,000	$400,000	2001-2002
58	Buffalo Narrows	Sewer Line Study	$20,000	$20,000	2001-2002
59	Pinehouse	Sewage Lagoon Expansion	$200,000	$200,000	2001-2002
60	Cumberland House	Water Treatment repairs	$100,000	$100,000	2001-2002
61	Cumberland House	Water Storage Expansion	$150,000	$150,000	2001-2002
62	Beauval	Fire Pump	$30,000	$30,000	2001-2002
63	Turnor Lake*	Water Storage Expansion	$150,000	$90,000	2001-2002
64	Uranium City	Replace WTP Boilers	$200,000	$200,000	2001-2002
65	St. George's Hill	Add Emergency Pump	$75,000	$75,000	2001-2002
66	La Ronge	Water Distribution Mains	$250,000	$250,000	2002-2003
67	La Ronge	Sewer Line Upgrades	$200,000	$200,000	2002-2003
68	La Ronge	Sewage Plant Upgrade	$650,000	$650,000	2002-2003
69	La Ronge	SPS Upgrade (#4)	$300,000	$300,000	2002-2003
70	Creighton	SPS upgrades	$200,000	$200,000	2002-2003
71	Ile a la Crosse	SPS upgrade (#1)	$40,000	$40,000	2002-2003
72	Ile a la Crosse	Sewage Lagoon Cleaning	$50,000	$50,000	2002-2003
73	Pelican Narrows*	Water Distribution Mains	$30,000	$1,500	2002-2003
74	Beauval	Sewage Lagoon Expansion	$200,000	$200,000	2002-2003
75	Beauval	SPS Upgrade	$10,000	$10,000	2002-2003
76	Wollaston Lake*	Water Distribution Mains	$200,000	$26,000	2002-2003
77	Turnor Lake*	Sewage Treatment Study	$25,000	$15,000	2002-2003
78	Turnor Lake*	Water Treatment Upgrade	$30,000	$18,000	2002-2003
79	Turnor Lake*	SPS repairs	$205,000	$123,000	2002-2003
80	Denare Beach	Sewage Plant Upgrade	$100,000	$80,000	2002-2003
81	Green Lake	SPS repairs	$20,000	$20,000	2002-2003
82	Green Lake	Sewage Lagoon repairs	$10,000	$10,000	2002-2003
83	Jans Bay	Service Wells	$30,000	$30,000	2002-2003
84	Uranium City	Water Distribution Study	$15,000	$15,000	2002-2003
85	Cole Bay	Water Distribution Pumps Repair	$10,000	$10,000	2002-2003
86	Cole Bay	SPS repairs	$10,000	$10,000	2002-2003
87	Cole Bay	Sewer System repairs	$10,000	$10,000	2002-2003
88	St. George's Hill	Water Treatment Study	$10,000	$10,000	2002-2003
89	Patunak	Water Treatment Upgrade	$5,000	$5,000	2002-2003
90	Timber Bay	Service Wells	$30,000	$30,000	2002-2003
91	Michel Village	Water Supply repairs	$500	$500	2002-2003
92	Michel Village	Add Emergency Pump	$75,000	$75,000	2002-2003
93	Michel Village	Distribution Pumping	$500	$500	2002-2003
94	Michel Village	Sewage Lagoon repairs	$1,000	$1,000	2002-2003
95	Michel Village	Calibrate WTP	$10,000	$10,000	2002-2003
96	[illegible]	SPS repairs	$1,000	$1,000	2002-2003
97	La Loche	Water Supply Improvements	$40,000	$40,000	2003-2004
98	La Loche	Water Storage Expansion	$325,000	$325,000	2003-2004
99	La Loche	SPS Upgrades (#1A)	$200,000	$200,000	2003-2004

TABLE 1 Combined List of Water and Sewer Projects by Year					
Rank	Community	Project	Total Cost	Provincial/NRSTA Local Cost	Year
12	Creighton	Water Supply Improvements	$50,000	$50,000	2000-2001
13	Ile a la Crosse	Water Distribution Pumps	$40,000	$40,000	2000-2001
14	Stanley Mission*	Distribution Pumping	$100,000	$11,000	2000-2001
15	Cumberland House	Water Distribution Mains	$1,200,000	$1,200,000	2000-2001
16	Cumberland House	Water Supply Improvements	$50,000	$50,000	2000-2001
17	Turnor Lake*	Distribution Pumping	$10,000	$6,000	2000-2001
18	Green Lake	New Well	$50,000	$50,000	2000-2001
19	Sled Lake	Sewage Lagoon Expansion	$80,000	$80,000	2001-2002
20	Camsell Portage	Water Treatment Plant	$450,000	$450,000	2001-2002
21	Black Point	Septic Tanks	$140,000	$140,000	2001-2002
22	Brabant Lake	Sewage Lagoon Repairs	$25,000	$25,000	2001-2002
23	Black Point	Water Treatment Plant	$350,000	$350,000	2001-2002
24	Black Point	Sewage Lagoon	$70,000	$70,000	2001-2002
25	Bear Creek	Septic Tanks	$90,000	$90,000	2001-2002
26	Bear Creek	Sewage Lagoon	$70,000	$70,000	2001-2002
27	Descharme Lake	Septic Tanks	$150,000	$150,000	2001-2002
28	Descharme Lake	Sewage Lagoon	$60,000	$60,000	2001-2002
29	Garson Lake	Water Treatment Plant	$350,000	$350,000	2001-2002
30	Garson Lake	Septic Tanks	$160,000	$160,000	2001-2002
31	Garson Lake	Sewage Lagoon	$60,000	$60,000	2001-2002
32	Sled Lake	Water Distribution Mains	$230,000	$230,000	2001-2002
33	Sled Lake	Sewer Collection Piping	$350,000	$350,000	2001-2002
34	Southend*	Sewage Treatment	$1,000,000	$10,000	2001-2002
35	Southend*	Water Distribution Mains	$295,000	$2,950	2001-2002
36	Southend*	Water Treatment Plant	$600,000	$6,000	2001-2002
37	Southend*	Water Supply Improvements	$50,000	$500	2001-2002
38	Southend*	Sewage Collection	$860,000	$8,600	2001-2002
39	Camsell Portage	Composting Toilets	$17,000	$17,000	2001-2002
40	Black Point	Cisterns	$140,000	$140,000	2001-2002
41	Bear Creek	Cisterns	$90,000	$90,000	2001-2002
42	Bear Creek	Water Treatment Plant	$350,000	$350,000	2001-2002
43	Descharme Lake	Cisterns	$150,000	$150,000	2001-2002
44	Descharme Lake	Water Treatment Plant	$350,000	$350,000	2001-2002
45	Garson Lake	Water Cisterns	$160,000	$160,000	2001-2002
46	Pinehouse	Distribution Pumping	$100,000	$100,000	2001-2002
47	La Loche	Water Storage Expansion	$75,000	$75,000	2001-2002
48	La Loche	Sewage Lagoon	$20,000	$20,000	2001-2002
49	Air Ronge*	Sewer Study	$30,000	$10,200	2001-2002
50	Air Ronge*	SPS Upgrades (#3)	$50,000	$50,000	2001-2002
51	La Ronge	Water Storage Expansion (WTP)	$250,000	$250,000	2001-2002
52	La Ronge	Water Distribution Study	$30,000	$30,000	2001-2002
53	La Ronge	Sewer Study	$30,000	$30,000	2001-2002
54	Creighton	Water Distribution Study	$30,000	$30,000	2001-2002
55	Creighton	Sewer Line Study	$30,000	$30,000	2001-2002

TABLE 1 Combined List of Water and Sewer Projects by Year					
Rank	Community	Project	Total Cost	Provincial/NRSTA Local Cost	Year
56	Ile a la Crosse	Fire Hydrants	$5,000	$5,000	2001-2002
57	Buffalo Narrows	Water Storage Expansion	$400,000	$400,000	2001-2002
58	Buffalo Narrows	Sewer Line Study	$20,000	$20,000	2001-2002
59	Pinehouse	Sewage Lagoon Expansion	$200,000	$200,000	2001-2002
60	Cumberland House	Water Treatment repairs	$100,000	$100,000	2001-2002
61	Cumberland House	Water Storage Expansion	$150,000	$150,000	2001-2002
62	Beauval	Fire Pump	$30,000	$30,000	2001-2002
63	Turnor Lake*	Water Storage Expansion	$150,000	$90,000	2001-2002
64	Uranium City	Replace WTP Boilers	$200,000	$200,000	2001-2002
65	St. George's Hill	Add Emergency Pump	$75,000	$75,000	2001-2002
66	La Ronge	Water Distribution Mains	$250,000	$250,000	2002-2003
67	La Ronge	Sewer Line Upgrades	$200,000	$200,000	2002-2003
68	La Ronge	Sewage Plant Upgrade	$650,000	$650,000	2002-2003
69	La Ronge	SPS Upgrade (#4)	$300,000	$300,000	2002-2003
70	Creighton	SPS upgrades	$200,000	$200,000	2002-2003
71	Ile a la Crosse	SPS upgrade (#1)	$40,000	$40,000	2002-2003
72	Ile a la Crosse	Sewage Lagoon Cleaning	$50,000	$50,000	2002-2003
73	Pelican Narrows*	Water Distribution Mains	$30,000	$1,500	2002-2003
74	Beauval	Sewage Lagoon Expansion	$200,000	$200,000	2002-2003
75	Beauval	SPS Upgrade	$10,000	$10,000	2002-2003
76	Wollaston Lake*	Water Distribution Mains	$200,000	$26,000	2002-2003
77	Turnor Lake*	Sewage Treatment Study	$25,000	$15,000	2002-2003
78	Turnor Lake*	Water Treatment Upgrade	$30,000	$18,000	2002-2003
79	Turnor Lake*	SPS repairs	$205,000	$123,000	2002-2003
80	Denare Beach	Sewage Plant Upgrade	$100,000	$80,000	2002-2003
81	Green Lake	SPS repairs	$20,000	$20,000	2002-2003
82	Green Lake	Sewage Lagoon repairs	$10,000	$10,000	2002-2003
83	Jans Bay	Service Wells	$30,000	$30,000	2002-2003
84	Uranium City	Water Distribution Study	$15,000	$15,000	2002-2003
85	Cole Bay	Water Distribution Pumps Repair	$10,000	$10,000	2002-2003
86	Cole Bay	SPS repairs	$10,000	$10,000	2002-2003
87	Cole Bay	Sewer System repairs	$10,000	$10,000	2002-2003
88	St. George's Hill	Water Treatment Study	$10,000	$10,000	2002-2003
89	Patunak	Water Treatment Upgrade	$5,000	$5,000	2002-2003
90	Timber Bay	Service Wells	$30,000	$30,000	2002-2003
91	Michel Village	Water Supply repairs	$500	$500	2002-2003
92	Michel Village	Add Emergency Pump	$75,000	$75,000	2002-2003
93	Michel Village	Distribution Pumping	$500	$500	2002-2003
94	Michel Village	Sewage Lagoon repairs	$1,000	$1,000	2002-2003
95	Michel Village	Calibrate WTP	$10,000	$10,000	2002-2003
96	Michel Village	SPS repairs	$1,000	$1,000	2002-2003
97	La Loche	Water Supply Improvements	$40,000	$40,000	2003-2004
98	La Loche	Water Storage Expansion	$325,000	$325,000	2003-2004
99	La Loche	SPS Upgrades (#1A)	$200,000	$200,000	2003-2004

TABLE 1		Combined List of Water and Sewer Projects by Year			
Rank	**Community**	**Project**	**Total Cost**	**Provincial/NRSTA Local Cost**	**Year**
100	Air Ronge*	SPS Upgrades (#5 & B2)	$650,000	$221,000	2003-2004
101	La Ronge	SPS Upgrades	$500,000	$500,000	2003-2004
102	Creighton	Water Distribution Mains	$600,000	$600,000	2003-2004
103	Creighton	Sewer Line Upgrades	$300,000	$300,000	2003-2004
104	Ile a la Crosse	Water Storage Expansion	$100,000	$100,000	2003-2004
105	**Cole Bay**	**Water Supply Improvements**	**$10,000**	**$10,000**	**2003-2004**
106	Pinehouse	Water Treatment Upgrade	$900,000	$900,000	2004-2005
107	Pelican Narrows*	SPS Upgrades	$300,000	$15,000	2004-2005
108	Buffalo Narrows	Fire Hydrants	$100,000	$100,000	2004-2005
109	Buffalo Narrows	Sewer Line Upgrades	$150,000	$150,000	2004-2005
110	Buffalo Narrows	SPS Upgrade	$200,000	$200,000	2004-2005
111	Sandy Bay*	Distribution Pumping	$50,000	$35,000	2004-2005
112	Sandy Bay*	Water Distribution Mains	$100,000	$70,000	2004-2005
113	Sandy Bay*	Water Storage Expansion	$200,000	$140,000	2004-2005
114	Wollaston Lake*	Intake Pump repair	$100,000	$12,000	2004-2005
115	Wollaston Lake*	SPS repairs	$250,000	$30,000	2004-2005
116	Denare Beach	SPS upgrade	$70,000	$70,000	2004-2005
117	Green Lake	Fire Hydrants	$30,000	$30,000	2004-2005
118	Missinipe	Add Emergency Pump	$80,000	$80,000	2004-2005
119	Missinipe	SPS Upgrade	$50,000	$50,000	2004-2005
120	St. George's Hill	Service Wells	$10,000	$10,000	2004-2005
121	St. George's Hill	Water Filter Upgrades	$20,000	$20,000	2004-2005
122	Patunak	Distribution Pumping	$5,000	$5,000	2004-2005
123	Patunak	Service Wells	$10,000	$10,000	2004-2005
124	Dore Lake	Sewage Lagoon expansion (study)	$20,000	$20,000	2004-2005
125	Timber Bay	Add Emergency Pump	$180,000	$180,000	2004-2005

Bold indicates unserviced communities, * shows joint system with reserve

TABLE 1 Combined List of Water and Sewer Projects by Year					
Rank	**Community**	**Project**	**Total Cost**	**Provincial/NRSTA Local Cost**	**Year**
100	Air Ronge*	SPS Upgrades (#5 & B2)	$650,000	$221,000	2003-2004
101	La Ronge	SPS Upgrades	$500,000	$500,000	2003-2004
102	Creighton	Water Distribution Mains	$600,000	$600,000	2003-2004
103	Creighton	Sewer Line Upgrades	$300,000	$300,000	2003-2004
104	Ile a la Crosse	Water Storage Expansion	$100,000	$100,000	2003-2004
106	Pinehouse	Water Treatment Upgrade	$900,000	$900,000	2004-2005
107	Pelican Narrows*	SPS Upgrades	$300,000	$15,000	2004-2005
108	Buffalo Narrows	Fire Hydrants	$100,000	$100,000	2004-2005
109	Buffalo Narrows	Sewer Line Upgrades	$150,000	$150,000	2004-2005
110	Buffalo Narrows	SPS Upgrade	$200,000	$200,000	2004-2005
111	Sandy Bay*	Distribution Pumping	$50,000	$35,000	2004-2005
112	Sandy Bay*	Water Distribution Mains	$100,000	$70,000	2004-2005
113	Sandy Bay*	Water Storage Expansion	$200,000	$140,000	2004-2005
114	Wollaston Lake*	Intake Pump repair	$100,000	$12,000	2004-2005
115	Wollaston Lake*	SPS repairs	$250,000	$30,000	2004-2005
116	Denare Beach	SPS upgrade	$70,000	$70,000	2004-2005
117	Green Lake	Fire Hydrants	$30,000	$30,000	2004-2005
118	Missinipe	Add Emergency Pump	$80,000	$80,000	2004-2005
119	Missinipe	SPS Upgrade	$50,000	$50,000	2004-2005
120	St. George's Hill	Service Wells	$10,000	$10,000	2004-2005
121	St. George's Hill	Water Filter Upgrades	$20,000	$20,000	2004-2005
122	Patunak	Distribution Pumping	$5,000	$5,000	2004-2005
123	Patunak	Service Wells	$10,000	$10,000	2004-2005
124	Dore Lake	Sewage Lagoon expansion (study)	$20,000	$20,000	2004-2005
125	Timber Bay	Add Emergency Pump	$180,000	$180,000	2004-2005
Bold indicates unserviced communities, * shows joint system with reserve					

5. FUNDING AND FINANCIAL CAPACITY

5.1 Capital Costs

The unserviced communities have average annual revenues of around $100,000 with average expenses of $85,000 (1997 figures). Over 80% of this income is from grants. These communities have some accumulated surplus, averaging around $133,000 per community. These funds are not sufficient to fund major capital infrastructure expenditures.

Serviced communities have average annual revenues of $600,000 (46% from grants) with expenses of over $590,000 (1997 figures). Some communities have accumulated surpluses (average $280,000), but five have accumulated deficits. Utility system costs average $93,000 with average revenues of $87,000 (an average annual deficit of $6,000).

None of the communities has the financial capacity to fund major expansions or repairs to their water and sewer systems. The additional funding must be obtained through grants or long term municipal borrowing.

The average mill rate in the serviced communities is 11, and 5 in the unserviced communities. There may be some flexibility to increase local mill rates to pay for water and sewer, however, the ability of local residents to pay increased taxes was not assessed in the study. Generally, it is understood that the residents will not have the capability to absorb significant tax increases to pay for capital works.

In the unserviced communities, the limited tax base (average total assessment of $548,000) further limits the community's ability to raise adequate capital at the local level. At a mill rate of 18, the average local tax levy would still be under $10,000 per year in these communities.

Recommendation 3:

The committee recommends that the province make a five-year commitment of funding to the NRSTA to assist with the construction of the required water and sewer infrastructure works, with funding allocated on an annual basis.

Recommendation 4:

The committee recommends that the funding formula developed for a water and sewer infrastructure program recognize that analysis as part of the study confirmed that local communities have very limited fiscal capacity to contribute to the costs of the needed works and face both other capital needs and population growth.

Recommendation 5:

The committee recommends that in the event new federal funding for infrastructure development becomes available, the following options should be considered for use of the added federal money: a) accelerate the program of upgrading water and sewer infrastructure in the communities (to be completed in less than 5 years), or b) change the funding formula with

respect to contributions from the partners (province, NRSTA and municipalities), allocating any savings to other infrastructure needs in the northern communities.

Recommendation 6:

The committee recommends that local governments be given the opportunity to review and approve water and sewer project progress reports before progress payments are made.

5.2 Operation and Maintenance

Some projects identified as being required by the study involve general operation and maintenance (O&M) of the system, and as such are not capital works. These types of projects should be funded out of the annual municipal budget rather than the NRSTA or provincial grants. O&M costs include the salary of staff, electricity and heating for the buildings and equipment, materials needed to operate the systems (eg: chemicals, *etc.*), as well as repairs.

(a) Unserviced Communities' Operating and Maintenance Costs

In the unserviced communities, the installation of water and sewer services will have a significant impact on annual operating budgets. At present these communities have very little, if any expense, related to water and sewer. The projected O&M costs for the conventional system in Stony Rapids is $110,000 per year during the first five years, which is roughly $1000 per lot. The average O&M costs in the unserviced communities, based on the recommended systems, amounts to almost $5000 per household. The added operating costs have direct implications on funding from the NRSTA for operating grants.

Some of the communities have seasonal (summer) as well as permanent residents, which has implications for how the municipality can charge for services. Schools and commercial operations may be higher users of services. A separate levy may be appropriate for these uses.

TABLE 2 Estimated Operating and Maintenance Costs - Unserviced Communities						
Community	Est. Annual Total	Population	No. Lots	No. Houses	Avg/lot [1]	Avg/house[2]
Bear Creek	$60,000	47	17	11	$3,529.41	$5,454.55
Black Point	$80,000	43	17	14	$4,705.88	$5,714.29
Brabant Lake	$230,000	90	47	17	$4,893.62	$13,529.41
Camsell Portage	$120,000	50	53	11	$2,264.15	$10,909.09
Descharme Lake	$80,000	42	32	13	$2,500.00	$6,153.85
Garson Lake	$80,000	34	35	15	$2,285.71	$5,333.33
Sled Lake	$145,000	65	35	26	$4,142.86	$5,576.92
Southend*	$40,000	340	11	8	$3,636.36	$5,000.00
Stony Rapids	$110,000	340	110	80	$1,000.00	$1,375.00
AVERAGE	**$105,000**	**1051**	**357**	**195**	**$2,647.06**	**$4,846.15**
(1) Based on number of existing lots			*TLE community –population includes on reserve			
(2) Based on number of existing houses in 1998-99						

In 1997 most settlements had a moderate surplus on annual revenues and expenses (average $16,000). However, based on the study, the average annual O&M costs for a truck haul system (the preferred servicing option in six communities for the immediate future) are $108,000 or about $3,200 per lot. The surplus in the communities is not adequate to cover the added costs. It should be noted that the sewage truck haul costs for Sled Lake are around $25,000 per year, so the study estimates may be a bit high. O&M costs will still exceed the current municipal surpluses.

O&M costs for conventional systems in the other three communities' will average $98,000 per year or about $2,000 per lot. In Stony Rapids this is less than the present cost of trucking water and sewer.

There are four main options for addressing the issue of operating and maintenance costs in the unserviced communities. Most of these relate to the costs of the truck haul systems.

1. Increase the annual NRSTA grants to the communities to cover the added O&M costs. The current grants for serviced communities originally had a water and sewer factor included in the formula to assist with the operation of the systems. This option would require increasing local revenue by an average of over $108,000 per year to cover O&M costs (a total increase of almost $1 million per year in grants.) It is likely these grants would have to be increased over time to adjust for inflation and other cost increases.

2. Increase local mill rates to cover the O&M costs. However, based on local assessment, the mill rates would have to be increased to the range of 72 to 822 mills to cover the existing expenses plus the added water and sewer costs.

3. Establish service levies on homes and businesses in the community to cover the O&M costs. As noted in the table above, these levies would need to range from $1,400 to $13, 500 per year for full cost recovery. Truck haul costs for private operators are around $45 for sewer and $35 for water in most communities. Where the municipality operates the trucks, they usually charge less. For permanent residences, these costs are often incurred on a weekly basis, for an average annual cost of $4,160 per year (about $350 per month). Residents without any services at present would see significant increases in costs once services were in place.

4. A combination of service levies or tax increases on the residents, along with increased grants to help the local community offset the O&M costs. This would reduce the impact on residents and make using the system more acceptable. For example, for truck haul operations the homeowner could be responsible for the hauling costs, while the municipality would look after the costs of operating and maintaining the water treatment plant and sewage lagoon.

(b) Serviced Communities' Operating and Maintenance Costs

The upgrading of water and sewer in the serviced communities should not have a significant effect on the O&M costs since the community is already paying for these. Average expenses for utility operations in the serviced communities is around $93,000 per year. The costs are higher for larger communities and less for smaller ones. A major concern is that most utilities are presently operating at a deficit. These communities should review the service charges with a view to operating systems on a cost recovery basis.

Recommendation 7:

The committee recommends that communities establish a fee schedule for provision of water and sewer services that recognizes the cost to the community of providing the service as well as the ability of the residents to pay for the service.

Recommendation 8:

The committee recommends that as soon as soon as unserviced communities have water and sewer services installed, the NRSTA management board apply the existing funding formula allowing increases to operating grants to assist with defraying added operating and maintenance costs.

6. RELATED ISSUES

In considering the upgrading of the water and sewer systems, the committee identified issues and concerns that were outside the scope of the consultant's work. However, these were viewed as being related to the successful implementation of the infrastructure improvements, and must be addressed.

6.1 Training and System operation

Trained and qualified operators are critical to the safe and effective operation and maintenance of the systems. Communities larger than 500 in population are required to have a certified operator for the water and sewer system. A community should have a minimum of three trained people, a primary operator, a backup operator and a standby person. There are opportunities for communities to reduce operating costs by sharing operators among communities or with First Nations, as well as contracting out operations to outside agencies.

Lack of trained operators will increase the system repair costs as well as shorten the life span of the equipment. Improper operation of a water system has significant potential to affect the health of the residents served by the system. Sask. Water offers training programs for municipal and First Nations system operators. There are opportunities for joint training programs for band and municipal employees. Operator training can be offered as part of a training initiative for northern communities, or through Northlands College.

With projected investments of over $20 million in the systems, expertise is needed to ensure that the investment is properly operated and maintained. Some of the current costs are related to lack of proper maintenance of the systems. In addition to providing training for municipal staff, there will be a need to provide for the operation and maintenance of the systems in the northern settlements, which are administered by MACH. Almost $6 million in infrastructure improvements are being proposed for these communities.

In order to ensure these systems are operated and maintained, engineering services need to be available to the NSAD. In addition to supervising the operation of the settlements' systems, staff could also assist municipalities with issues of operation and maintenance as well as in the training program.

Recommendation 9:

The committee recommends that the NSAD obtain engineering services to oversee operation and maintenance of the water and sewer systems, particularly in the Northern Settlements (an estimated annual cost of $100,000).

Residents that have not used water and sewer systems before may need information on how to use the systems. The Health Districts may be able to provide a program for community education. A program to educate community residents in the proper use and cost of the water and sewer systems is needed to help reduce maintenance and repairs.

Recommendation 10:

The committee recommends that communities have trained operators available for the operation and maintenance of the water and sewer systems, and that a program be put in place to train and support these operators.

6.2 Housing Connections and Upgrades

Not all houses in the communities, particularly the unserviced ones, have indoor plumbing fixtures. In addition, while some of the project costs include the service connection to the house, the cost of installing plumbing in the house is not included. It is estimated there are 108 non-modern houses in the unserviced communities. Costs of retrofitting these houses with plumbing is estimated at around $7,500 per unit, for a total cost of $810,000.

A major objective of the study and the identified projects was to provide the residents of the communities with a safe, secure source of water and a safe, acceptable method of sewage disposal. If there are non-modern houses, or houses not connected to the systems once they are installed, this objective would not be met. This was beyond the scope of the study, however, the committee feels this is a critical component towards achieving the objective of the study and infrastructure investment.

In order for the community to achieve benefit from the installation of water and sewer systems, all occupied buildings in the community will have to be required to connect to the systems (by means of a bylaw under The Public Health Act).

In many cases, the residents will not be able to cover this cost. Where funding is not available under RRAP, alternative funding may need to be developed. As one option, the community could provide grants for upgrading the houses on a cost recovery basis.

Recommendation 11:

The committee recommends that communities pass bylaws requiring all occupied buildings in the community that abut the services to be connected to the system.

Recommendation 12:

The committee recommends that where holding tanks or cisterns are supplied, these houses be required to connect to them.

Recommendation 13:

The committee recommends that Municipal Affairs, Culture and Housing, (including Saskatchewan Housing Corporation) work with the NRSTA management board, the health districts, Social Services, communities and residents to develop a program to upgrade the non-modern houses. For example, the RRAP could be expanded or enhanced.

6.3 Electrical Power

The reliability of electrical power has been noted as a concern in many of the northern communities. Surges and brownouts have caused significant damage to components of water and sewer systems.

Power outages also sometimes result in backups in sewer systems and shut down water supply where the community has not provided backup gas fired pumps or emergency generators.

Recommendation 14:

The committee recommends that SaskPower be encouraged to upgrade its infrastructure to provide more reliable electrical services. In the interim it will be important for the communities to ensure that backup systems are in place to protect water and sewer equipment and services.

6.4 Subdivision Design and Development

(a) Community Planning

The study did not evaluate long term development needs of the communities other than population growth. Most northern communities are short of serviced land. The cost of providing serviced lots to meet current and anticipated population will be significant for the communities.

In order to determine the extent of subdivision needs, appropriate directions for growth and potential costs, additional information is needed for each community and for the NSAD as a whole. In addition, it is necessary for communities to establish long term development strategies.

While most of the larger communities have Basic Planning Statements and zoning bylaws, these are over 10 years old and are in need of updating. Preparation of new or updated plans will provide communities with opportunities to review the appropriate forms of development (eg. compact or scattered), the most suitable locations of development, timing of development based on growth projections, servicing levels to be provided, and impacts on capital budgeting.

In order to properly assess the demand for new subdivisions in each community, additional information is needed on:

- existing land use, vacant lots, number of existing residential units, housing condition;
- terrain and soil conditions;
- servicing line locations and limitations;
- population projections including analysis of household & family size in the community;
- projected dwelling unit requirements;
- subdivision concept plans; and
- cost estimates for the community on an annual basis.

Recommendation 15:

The committee recommends that communities update existing or adopt new community plans which outline the community's need for lots and identify areas that are suitable for development, along with time frames and costs of developing those areas.

Pressures are also building for development outside the established communities. This is a concern since, if allowed, it will create demands for the provision of new infrastructure. MACH encourages all new development to take place within the established communities to minimize infrastructure costs. In order to guide development into appropriate locations, land use plans should be developed for the unincorporated areas. In some cases these can be developed in cooperation with land and resource planning initiatives being undertaken by SERM.

Recommendation 16:

The committee recommends that land use plans be developed to guide future residential developments in the unincorporated areas of the NSAD. Development should be directed to locate in areas where services are available.

It was noted that subdivision design in the communities has an impact on servicing requirements. Smaller lots (eg. 20 by 35 metres) will generally end up needing a piped water and sewer system. Larger lots (around 0.5 hectares) may be able to function with individual systems such as wells and holding tanks.

Recommendation 17:

The committee recommends that the type of water and sewer services to be provided in new subdivisions be considered during the design of the subdivision. Where larger lots are desired, the community must make it clear to purchasers that piped water and sewer services will not be provided.

(b) New Subdivision Development

The water and sewer study did not assess the need and cost for developing new residential subdivisions in the northern communities.

Population growth in northern Saskatchewan is high at 3 to 5 per cent annually. In addition, the population in northern communities is relatively young with almost 50% of the population under 20. In addition to the growing population, many communities are already short of lots to meet existing needs. There are large household sizes. The average household size in Census Division 18 (Northern Saskatchewan) was 4 in 1991compared to 2.7 in Saskatchewan as a whole. A trend to smaller households will increase the need for new housing.

No recent inventory of the number of vacant lots in the communities is available. Indications are that the availability of vacant, serviced residential lots is low, especially in the northern villages.

The cost of developing a fully serviced residential lot (including survey, roads, power, phone, water and sewer) in 1998 was between $12,000 and $15,000 per lot. The estimated costs are based on $13,000 for year 5, $14,000 for year 10 and $15,000 for year 20. Actual costs may vary due to terrain conditions that require sewage lift stations or removal of bedrock.

The population projections from the water and sewer study help to estimate future land needs and costs in the communities. Over the next five years roughly 860 new lots will be needed in the northern communities to meet projected population growth. It is estimated that it will cost around $5.6 million to develop these lots. In 10 years an additional 950 lots will be needed at a cost of around $6.5 million.

These calculations are only for lots needed for residential development and do not include needs for commercial and industrial lots. Development needs in communities affected by TLE reserve establishment cannot be estimated, as the full effect of reserve creation is yet to be determined. In some cases, there are no areas remaining for municipal expansion as the community is fully surrounded by reserve.

Recommendation 18:

The committee recommends that the province and the NRSTA management board review program criteria relating to the funding of subdivision development. An agreement should be entered into identifying funding available for subdivision projects in the north for the next five years once water and sewer infrastructure needs have been provided for.

Appendix 1 – Community Specific Discussion

Unserviced Communities

1. Bear Creek

(a) Existing Situation

Bear Creek currently has two existing wells with electric pumps, which can supply three litres per second of water. Residents obtain their water by pail fill. Most houses have pit privies for sanitary disposal. For those few that do have septic tanks, the nearest sewage lagoon is located 44 kilometres away at La Loche.

Current water quality is good and treatment is not necessary.

There are 17 large surveyed lots in the community, with 11 houses, indicating 6 vacant lots/parcels.

(b) Works Needed

The consultant's report has recommended a low-pressure water system with septic pump out tanks for Bear Creek due to the larger lots and scattered development. It may be possible to phase this development over a number of years.

Costs of development of the water and sewer infrastructure in the community assume that hauling services will be available from La Loche, and that the community will not be required to buy its own hauling trucks. It would cost $300,000 more to install a conventional water and sewer system in the community than a lower pressure water system with holding tanks. It is estimated that the O&M costs for the conventional system would only be about $3,000 less per year, and costs would not be recovered in the short term.

Sewage Disposal - With an adequate supply of water and pumping capacity in the community, the most immediate need appears to be the provision of some form of sewage disposal. This would require the construction of a lagoon and installation of septic tanks for each of the houses that currently do not have one.

Water Distribution - The next phase of development would be to extend water delivery services to the houses by a low-pressure system. This could be supplied in the interim by provision of individual cisterns.

What is not assessed at this time is the number of houses that require modernization through the installation of plumbing systems as a result of infrastructure development.

(c) Time Frames and Costs

Project	Year	Cost
Sewage Lagoon	2001-2002	$70,000
Holding Tanks Installation	2001-2002	$ 90,000
Cisterns	2001-2002	$90,000
Water Treatment Plant	2001-2002	$350,000
Low pressure water system (pipes & service connections)	Future	$95,000

2. Black Point

(a) Existing Situation

Black Point has an existing well with an electric pump capable to supplying 2.3 litres per second of water, which is adequate for the period of the study.

However, the water quality is poor, containing high sodium chloride and sum of ions. The consultant indicates that a new water source is needed, as treatment of the existing supply would be expensive.

The community currently has 17 lots with 14 occupied houses, leaving few vacant properties. Eighteen more lots are proposed for development in 1999. Lots in the community are large and dispersed.

The number of houses requiring modernization through the installation of plumbing systems as a result of infrastructure development is not assessed.

(b) Works Needed

The consultant recommended a conventional system for the community. However, development of a low-pressure water system and holding tank pump similar to Bear Creek would appear to be the most suitable due to the larger lots and scattered locations of development.

The cost of a conventional water and sewer system for Black Point is around $275,000 higher than for a low pressure water system with septic holding tanks. Since the estimated O&M costs for the low-pressure water system/holding tanks are $26,000 per year more, the additional capital costs of a conventional system could be recovered in 10 years. Costs for truck haul systems do not include trucks as it is assumed that this service will be available from La Loche.

Water supply - Since water quality is a significant problem, the highest priority for Black Point is location of a suitable source of potable water.

Sewage treatment - Following this, the next priority would be construction of a method of sewage disposal.

Water distribution - Following this, the low-pressure water system can be installed in the community.

(c) Time Frame and Costs

Project	Year	Cost
Water Supply (new well)	2001-2002	$20,000
Sewage Lagoon	2001-2002	$70,000
Holding Tank installation	2001-2002	$140,000
Cisterns	2001-2002	$140,000
Water Treatment Plant	2001-2002	$350,000
Low pressure water system (pipes)	Future	$60,000

3. Brabant Lake

(a) Existing Situation

Brabant Lake gets its water from either Brabant Lake or the Waddy River. This surface water is very poor quality with bad colour, high turbidity, iron, manganese and trihalomethanes. Houses in the community are currently equipped with cisterns, and a local supplier hauls water.

The community also has a lagoon. However, it is in need of major repairs and renovations. Currently, the school is connected to the sewage lagoon with its own lift station and force main. The other houses in the community have holding tanks, which are pumped out by the local hauler.

The community has a fairly conventional subdivision design with 47 smaller lots and 5 larger parcels. There are 17 houses, a school, and a commercial outfitting operation in the community. There are still a large number of vacant lots (around 30) in the community, which may make installation of a piped system uneconomical at present.

The Local Advisory Committee advises that all houses have plumbing systems.

(b) Works Needed

The consultant has recommended a conventional water and sewer system. This would be the most suitable, but only if the population in the community grows, and the vacant lots infill. Using the existing cisterns and septic tanks, the system for Brabant Lake can be designed to allow for the phasing in of a conventional system. The cost difference between the truck haul system and the conventional system would be recovered in 3 years based on O&M costs.

Water quality is the highest concern in the community. It is critical to find either a new water supply, or construct a plant for treatment of the surface water. Truck delivery to individual cisterns is functioning and can be continued. However, depending on population growth, upgrading to a conventional water system could take place at some future point. The consultant's report indicates that operation of the water treatment plant, requires a sewage pumping station and force main to properly backwash the system.

Sewage treatment - While the existing lagoon is in need of repair, it is adequately sized and appears to be functioning properly. The current system of pump out holding tanks also appears acceptable for the immediate future. However, depending on population growth, upgrading to a conventional sewer system could take place at some future point.

(c) Time Frame and Costs

Project	Year	Cost
Water Supply/Treatment (incl. SPS and force main)	2000-2001	$480,000
Lagoon Repairs	2000-2001	$25,000
Piped Sewer Collection	Future	$350,000
Piped Water Distribution	Future	$470,000

4. Camsell Portage

(a) Existing Situation

Camsell Portage does not have any municipal water and sewer system. The school has a private well, as do seven houses. Most other homes use Lake Athabasca as their source of drinking water. The school's well water was tested and is high in iron and manganese. Residents indicate that the water table is at around 6 meters.

All houses in the community use pit privies. There is no lagoon in the community, although the school has a holding tank.

There are 53 conventional lots in the community, with 11 occupied houses plus the school. The community is located on a sand strip between two major bedrock outcrops, which makes location and construction of a lagoon difficult.

The community is isolated with fly in access only. There are no vehicles in the community.

(b) Works Needed

The consultant has recommended a conventional water and sewer system. The most immediate need is to develop a secure source of potable water for the community, followed by development of proper sewage disposal and treatment.

Only 20 per cent of the lots in the community are developed, which makes installation of a conventional water and sewer system impractical at present.

A truck haul system also has limitations due to difficulties in constructing a lagoon. There are no vehicles in the community for hauling at present.

Residents have expressed an interest in composting toilets rather than installing holding tanks or other methods of septic sewer disposal.

Cost of a composting toilet is around $1200 to $1500. For 11 houses, the cost would be $16,500. The viability of composting toilets is not known. Also the matter of grey water disposal would have to be considered as this can contaminate the ground water. Options for grey water disposal will have to be reviewed if composting toilets are installed in the community.

In addition to this, individual wells could have to be provided for the houses that don't have them presently. However, indications are that the ground water in the area is high in iron and manganese. A central treatment plant could improve quality by reducing these levels. However, in the absence of adequate sewage disposal, improved provision of water services, such as through a small diameter or conventional system could cause problems by increasing grey water generation.

The number of houses requiring modernization through the installation of plumbing systems as a result of infrastructure development is not assessed.

The most critical need is to improve the water supply in the community. If a community well or the lake is used as a source, a treatment plant should be constructed as well. Composting toilets can be installed, however further review of options for sewage handling is needed.

(c) Time Frames and Costs

Project	Year	Cost
Water Supply (individual wells/community well)	2001-2002	$50,000
Water Treatment Plant (review)	2001-2002	$450,000
Composting Toilets	2001-2002	$17,000
Sewage Lagoon (review)	Future	$90,000
Sewage Holding Tanks (review)	Future	$210,000
Water Distribution	Future	$650,000

5. Descharme Lake

(a) Existing Situation

There is a community well supplying water at 0.4 litres per second. This supply is nearing capacity with demand at 0.44 lps and the water has a high manganese content. Distribution is by pail fill.

All houses use pit privies. There is a septic tank at the school, but the nearest lagoon is at La Löche, 85 kilometres away.

The community has 32 lots with 13 occupied houses, a K-8 school and an outfitter. The lots in the community are relatively conventionally sized, but are spaced out, with a large number of existing vacant lots, resulting in added costs for servicing.

The number of houses requiring modernization through the installation of plumbing systems as a result of infrastructure development is not assessed.

(b) Works Needed

The consultant has recommended a conventional water and sewer system. However, a small diameter water system with a low-pressure sewer system is the most economical to install and operate. This has the advantage of being able to be phased in.

Water supply and quality - The current well is near capacity and water quality is poor. The most immediate need is to ensure an adequate supply of potable water for the residents. Treatment and distribution improvements can be added later.

Sewage treatment and collection - Development of a sewage lagoon and a method of sewage collection needs to be developed in the community. Initially, holding tanks can serve as a method of collection, with low-pressure piping added later.

(c) Time Frames and Costs

Project	Year	Cost
Water Supply	2001-2002	$20,000
Sewage Lagoon	2001-2002	$60,000
Holding Tanks	2001-2002	$150,000
Water Treatment	2001-2002	$350,000
Cistern	2001-2002	$150,000
Low Pressure Sewage Collection	Future	$90,000
Small Diameter Water	Future	$130,000

6. Garson Lake

(a) Existing Situation

Water supply is from one well providing 0.4 litres per second. The well has adequate capacity for current needs, but will need improvement within 5 to 10 years. Water quality meets provincial guidelines, but nitrates need to be monitored as they are nearing unacceptable levels.

All houses use pit privies. The school has a septic tank, but the nearest lagoon is in La Loche.

There are 35 lots in the community with 15 occupied houses and a K to 8 school. Lots are a bit larger than conventional lots, but they are clustered so piped services should not be excessively expensive. At present, around half the lots are undeveloped.

The number of houses requiring modernization through the installation of plumbing systems as a result of infrastructure development is not assessed.

(b) Works Needed

The consultant has recommended a conventional water and sewer system. Small diameter water with a low-pressure sewer would be the most economical for the community. It is slightly more costly to install than a conventional system ($40,000), but lower O&M costs make the system preferable for the long term. In addition, this type of system can be phased in as the community develops.

Water supply is adequate for 5 to 10 years and quality is acceptable. A treatment plant and distribution lines can be added at some point in the future.

The most immediate need would appear to be development of proper sewage disposal and treatment. This would require construction of a lagoon and installation of holding tanks.

(c) Time Frames and Costs

Project	Year	Cost
Sewage Lagoon	2001-2002	$60,000
Septic Tanks	2001-2002	$160,000
Water Treatment Plant	2001-2002	$350,000
Water Cisterns	2001-2002	$160,000
Small Diameter Water Lines	Future	$120,000
Low Pressure sewer system	Future	$90,000

7. Sled Lake

(a) Existing Situation

The community uses Sled Lake as the water source. The supply is good, but there are significant problems with water quality, including lead. There is an existing small diameter piped water system in the community, so distribution is not an immediate concern.

All houses currently have septic holding tanks that are pumped out by a community truck. There is a sewage lagoon, but the facility is undersized and in need of repairs.

There are 35 residential lots in the community, which are mostly developed. There are community buildings and two commercial outfitters in Sled Lake. The lots are quite large and spread out over a large area.

(b) Works Needed

The consultant has recommended a conventional water and sewer system. The existing 50mm water lines are not installed to engineering standards and are undersized for any type of supply. While they may serve in the short term, they will need to be replaced with conventional lines in the near future.

Water Quality - This is the most serious concern and needs to be addressed soon. Some of the problems with quality appear related to the location of the lake intake in shallow water, but relocation to a deeper area may not be possible. In addition, the intake well is experiencing corrosion problems which could be contributing to the quality problem. Either an alternate water source, such as a deep well or a treatment plant is needed. The cost of the water component will be affected by the source of the water supply.

Sewage - The existing truck haul is working well for collection. However, the lagoon is in need of expansion and repair. In the long term, the difference in cost between a low-pressure sewer system and a conventional sewer system is not significant. The conventional sewer system would be cheaper in this case.

(c) Time Frames and Costs

Project	Year	Cost
Water Supply/Treatment (includes SPS and force main)	2000-2001	$480,000
Sewage Lagoon Expansion	2001-2002	$80,000
Water Line Replacement	2001-2002	$230,000
Sewer Collection Piping (includes service connection)	2001-2002	$350,000

8. Southend

(a) Existing Situation

The Northern Settlement is located beside the Southend Indian Reserve, which has a conventional water and sewer system. The settlement has minimal water and sewer services existing. In addition, a large portion of the community has been converted to TLE reserve. The recommendations in the consultant's report are based on the expansion of the Band system to the Settlement area.

There is an existing well in the community.

There are 62 lots in the community area, including a school, RCMP and a SERM compound. Almost all the lots are developed, but only 11 remain outside the TLE reserve.

Some buildings have holding tanks for sewage disposal. There are some private wells, which provide good quality water.

(b) Works Needed

The consultant has recommended a conventional water and sewer system as an expansion of the existing on-reserve system.

(c) Time Frames and Costs

Project	Year	Cost*
Water Supply Line	2001-2002	$500
Reservoir	2001-2002	$6,000
Water Distribution	2001-2002	$2,950
Sewage Collection	2001-2002	$8,600
Sewage Treatment	2001-2002	$10,000

*Municipal share only

9. Stony Rapids

(a) Existing Situation

There is an existing water supply and treatment system, which is in place for a very limited area. The system does not have the capacity to be expanded to serve the entire community. As a result a new supply and treatment system will be required to provide adequate water.

A sewage lagoon was constructed in 1998, which has adequate capacity for the projected population. However, there are limitations respecting the method of collection as most houses still use pit privies. Some buildings have holding tanks.

This is the largest unserviced community in the study. The community is facing strong development pressures, including the proposed development of a new health care centre on the adjoining Reserve. Most lots in the community are a conventional size, but development is stretched out along the shore of the lake. In addition, topography will impact servicing costs.

The number of houses requiring modernization through the installation of plumbing systems as a result of infrastructure development is not assessed.

(b) Works Needed

The consultant has recommended a conventional water and sewer system.

Water supply is the most critical issue to ensure residents have access to a secure source of potable water. A new intake and treatment facility is recommended, as the existing system is deficient. Distribution by a conventional piped system would be preferred as cost differences between this and the other options, other than for truck haul, are minimal.

With the lagoon constructed, a mechanism must be put in place for collection of the sewage. Again the cost difference between a low pressure system and a conventional system is minimal.

(c) Time Frames and Costs

Project	Year	Cost
Water Supply/Treatment Plant	2000-2001	940,000
Sewage Collection	2000-2001	$1,400,000
Water Distribution	2000-2001	$1,100.000

Serviced Communities

1. Air Ronge

(a) Existing Situation

Air Ronge has a joint water and sewer system with the Lac La Ronge Indian Band. The water system has an expansion proposed (ie. a new water treatment plant (WTP) at Bells Point.) There is a need to determine if this assumed to be paid for, as no NRSTA funds have been allocated yet, and INAC has no immediate plans to install the treatment system at Bells Point. Once this is in place, the water system will have adequate capacity for the next 20 years. Water quality issues have been addressed through adjustments in treatment.

A new sewage lagoon was constructed in 1996-97. This has adequate capacity for the next 20 years. However, problems with the sewage pumping stations (SPS) have been noted. SPS No. 3 is already being overloaded and others will reach capacity in the next 5 years. Other problems have been noted with sewage flows and additional study is needed to determine what improvements are required.

(b) Works Needed

Upgrading the capacity of SPS No. 3 is most critical as it is already under capacity. SPS No. 5 and Band SPS No. 2 will reach capacity within five years.

Surcharging problems have been noted in the sewer collection system, and a more detailed study is needed to determine the cause and remedy.

Emergency power supplies (gensets) are also recommended for those SPSs that don't have them to provide pumping capacity in the event of a power outage.

(c) Time frame and Costs

Project	Year	Cost	Provincial/Municipal Share (estimate)
SPS Upgrades (#3)*	2001-2002	$50,000	$50,000
Sewer Study	2001-2002	$30,000	$10,200
SPS Upgrades (#5 etc.)	2003-2004	$650,000	$221,000

* SPS #3 serves only the village area so is not cost shared.

2. Beauval

(a) Existing Situation

Beauval's water system is in relatively good condition and has adequate capacity for the time frame of the study. However, some concerns have been expressed about the age of the water distribution system. After year 10 the water storage capacity may need expansion.

The sewage lagoon is undersized for the current population and needs expansion.

Repairs to some components such as well #3, the WTP and some SPSs are also needed.

(b) Works Needed

Expansion of the treatment and storage cell of the sewage lagoon is the main item needed. The storage cell appears to be infiltrating into the ground which reduces the demand somewhat, but may cause environmental problems as the lagoon is near the river.

The repairs to the well have received funding approval ($67,940 on an $86,000 project) in 1999-2000. The standby/fire pump in 20 years old and should be replaced. Additional fire hydrants are needed.

(c) Time frame and Costs

Project	Year	Cost
Well repairs	1999-2000	$67,940(paid)
Standby/fire pump	2001-2002	$30,000
Sewage Lagoon expansion	2002-2003	$200,000
SPS Upgrade	2002-2003	$10,000

3. Buffalo Narrows

(a) Existing Situation

The WTP does not have adequate capacity for current demand. There are problems with meeting water demand in the summer. The plant is proposed for upgrading in 1999, and $395,000 funding was approved for the project under the current program.

Serious safety and operational concerns exist at the WTP as connections exist between the chlorine room and washroom. The standby/fire pump may be approaching its life expectancy. The water reservoir capacity is below SERM guidelines.

Possible problems with sewer lines have been noted in parts of the community. This needs more study (in the area of Pederson Avenue and Davey Street). Pieces of clay pipe were noted when the lines were flushed.

Repairs are needed at several of the SPSs to resolve health and safety concerns (ventilation, equipment missing, no backup systems). The lagoon also needs some repairs.

(b) Works Needed

Repairs and expansion to the WTP are most important in order to meet existing demand, as well as address safety concerns.

A study of the sewer system is needed to identify what problems may be occurring. If there are serious problems, additional costs may be needed to fix them.

The water reservoir expansion is needed as it has only half the capacity for current needs.

(c) Time frame and Costs

Project	Year	Cost
Water Treatment PlantSewer Study	1999-2000	$395,000
Sewer Study	2001-2002	$20,000
Water Reservoir	2001-2002	$400,000
Fire Hydrants	2004-2005	$100,000
SPS Upgrades	2004-2005	$200,000
Sewer Line Upgrades(1)	2004-2005	$150,000

(1) Depending on results of sewer study, and may be needed sooner.

4. Cole Bay

(a) Existing Situation

Cole Bay's water and sewer system has adequate capacity for at least 20 years, and the system is in good condition aside from some repairs, including pump over haul. More work may be needed as the population approaches the design population.

(b) Works Needed

No immediate major works are needed other than some repairs and maintenance at the water treatment plant and the sewage pumping stations.

(c) Time frame and Costs

Project	Year	Cost
Water pump repairs	2002-2003	$10,000
SPS repairs	2002-2003	$10,000
Sewer system repairs	2002-2003	$10,000
Water supply pump upgrade	2003-2004	$10,000

5. Creighton

(a) Existing Situation

The water and sewer system in Creighton has adequate capacity, but there are concerns with the ability of the system to supply the services to an acceptable standard.

The temporary water supply connection to Bootleg Lake needs to be made permanent to provide the community with a secure water supply. Concerns with the water distribution system's ability to deliver required fire flows to fire critical buildings has been noted, and requires more detailed study. Twinned or larger water mains may be needed to resolve the concerns.

The sewer system has grade misalignments and has had pipe separations and breaks in recent years. A more detailed inspection is needed. Repairs or upgrading may be needed to the lines.

There are four sewer pumping stations which have adequate capacity to meet the projected needs. However, improvements are needed to address safety issues and emergency backup.

Longer term requirements (10 years and more) include upgrading water storage and sewage treatment plant capacity.

(b) Works Needed

The most urgent need is obtaining permanent connection (license) to Bootleg Lake for water supply (Saskatchewan Water Corporation approved for the existing connection is needed.)

In addition studies of water distribution and sewage collection systems are needed to determine the exact scope of the problems and works required to repair them.

(c) Time frame and Costs

Project	Year	Cost
Water Supply from Bootleg Lake	2000-2001	$50,000
Water Distribution Study	2001-2002	$30,000
Sewer System Study	2001-2002	$30,000
SPS upgrades	2002-2003	$200,000
Water Distribution Upgrade(1)	2003-2004	$600,000
Sewer Collection Improvements(1)	2003-2004	$300,000

(1) Depending on results of the study.

6. Cumberland House

(a) Existing Situation

The water supply system has adequate supply and capacity, but the intake structure is in poor condition, requiring major repairs, including replacement of some equipment in order to remain functional.

The WTP also has adequate capacity to meet the community's needs, but equipment is in need of repair or replacement. Power surges have damaged equipment, including pumps, at the WTP and some have to be operated manually. The emergency pump isn't working.

Water storage is below recommended guidelines and also needs repairs.

The water mains have experienced 20 breaks in the last seven years. There is evidence that the iron pipe is experiencing severe corrosion.

Three sewer main breaks have occurred in recent years at Cook Avenue, Morin Avenue and Crate Avenue. The mains have adequate capacity, but the community lacks safety equipment for doing sewer work.

Both SPSs have adequate capacity, but need major repairs and addition of safety equipment. The force main from SPS 1b may need to be lowered below the frost line.

The sewage lagoon has adequate capacity for at least 20 years, but the discharge channel requires clearing of vegetation.

(b) Works Needed

Water main replacement is critical, and funding for some replacements has been approved for 1999-2000 ($553,000 on $700,000 of work). However, this is only phase 1 of the project and additional replacement expenditures will be needed in the next year.

Water intake and water treatment plant repairs are needed to ensure safe supply and operation.

Water storage improvements are needed.

SPS and force main repairs are needed.

(c) Time frame and Costs

Project	Year	Cost
Water Main Repairs (phase 1)	1999-2000	$700,000
Water Main Repairs (phase 2)	2000-2001	$1,200,000
Water Intake Repairs	2000-2001	$50,000
WTP Repairs	2001-2002	$100,000
Water Storage Expansion	2001-2002	$150,000

7. Denare Beach

(a) Existing Situation

Denare Beach's water system has adequate capacity for the period of the study, and is in good condition. Further studies may be needed in 10 years, with possible expansion needed in 20 years.

The sewage treatment plant has problems with meeting peak flows and improvements are needed to improve current treatment capacity. Additions made in 1999 will improve the efficiency of the plant, but not capacity. Additional expansion may be needed in 10 years. The other components of the sewer system have adequate capacity. The SPSs lack back up power supply/emergency pumps.

It should be noted, that the potential development of a TLE reserve in the community may shorten the time frame on the need for expansion of some of the services. However, these upgrades would be jointly undertaken with INAC and the First Nation.

(b) Works Needed

Upgrade the capacity of the sewage treatment plant.

Add emergency generators/pumps to the SPSs.

In 10 years, undertake further study of the water and sewer systems.

(c) Time frame and Costs

Project	Year	Cost
Sewage Plant Upgrade	2002-2003	$100,000
SPS Upgrades	2004-2005	$70,000

8. Dore Lake

(a) Existing Situation

The water system has adequate capacity for the period of the study, but the location of the water intake is in a shallow weedy area of the lake, affecting water quality and may be subject to freezing. The water distribution system is only 100 mm mains and does not have capacity for fire fighting. The WTP building is too small to allow for plant expansion. Water storage capacity may need to be expanded by year 20.

The community uses holding tanks for sewage disposal. The community owns and operates the truck. The sewage lagoon appears to be under capacity based on water consumption records, but visual inspection doesn't show any problems.

(b) Works Needed

The water supply situation must be addressed to provide the community with an assured water supply. $110,000 is being spent in 1999-2000 to improve the intake.

The consultant has recommended that the septic tank and pump out system be replaced with the conventional gravity sewer system. In addition, the capacity of the sewage lagoon needs additional investigation to determine its capacity.

Residents seem satisfied with the current method of sewage collection, and there does not appear to be an urgent need to replace it with a conventional sewer system.

(c) Time frame and Costs

Project	Year	Cost
Water Supply Improvements	1999-2000	$110,000 (paid)
Sewage lagoon study	2004-2005	$20,000

9. Green Lake

(a) Existing Situation

The water supply for the community is inadequate and needs to be upgraded. The WTP has adequate capacity for year 20, but repair and upgrading of the pumps are needed.

The water distribution line setup could be improved for emergency purposes. (The 50 mm return line can't be used for emergency backup.) Additional fire hydrants are also needed. Some curb stops are old and in need of replacement.

There are concerns that clay tile sewer pipe may be deteriorating. A prior study showed 40% of the existing sewer pipe system is in need of replacement.

The SPSs have adequate capacity, but need repairs.

The sewage lagoon has adequate capacity, but needs repair and maintenance.

(b) Works Needed

Upgrading of the water supply, which may involve a new well and pumps.

Sewage main replacement has received funding approval in 1999-2000 for a $300,000 project.

(c) Time frame and Costs

Project	Year	Cost
Sewage main replacement	1999-2000	$250,000
Water Supply improvement	2000-2001	$50,000
Lagoon Repairs	2002-2003	$10,000
SPS repairs	2002-2003	$20,000
Fire Hydrants	2004-2005	$30,000

10. Ile a la Crosse

(a) Existing Situation

The water distribution pumping capacity of Ile a la Crosse is below required needs and must be upgraded. The storage reservoir is at capacity and needs upgrading within the near future. The remainder of the water system has adequate capacity at least for the next 10-15 years.

The water supply intake is in shallow water and has algae build up in summer. There is also a danger of freezing in winter.

Some corrosion was noted on iron water distribution pipes but no problems have been noted to date. Additional fire hydrants are also needed for improved coverage.

SPS #1 is under capacity at present . Only one SPS has a backup power supply, but funding was provided for purchase of a power generator in 1999-2000 (project cost $80,000). None of the SPSs have swab launch facilities. The lagoon may need upgrading by year 20. Currently it requires some maintenance.

(b) Works Needed

Water distribution pumping capacity and water storage need to be expanded.

Expansion of the capacity at SPS #1 is needed.

Maintenance and repairs at the SPSs and sewage lagoon.

(c) Time frame and Costs

Project	Year	Cost
Water distribution pumps	2000-2001	$40,000
Fire Hydrants	2001-2002	$5,000
Sewage lagoon maintenance	2002-2003	$50,000
SPS #1 expansion	2002-2003	$40,000
Water reservoir upgrade	2003-2004	$100,000

11. Jans Bay

(a) Existing Situation

Jans Bay's water and sewer systems have adequate capacity for the term of the 20 year period.

There is some indication that the capacity of the water supply from the 2 wells has declined over time, possibly from plugged screens.

Iron content is high in the treated water.

There were three water main breaks 1996-97 due to frost action.

The sewage lagoon may need expansion in 20 years.

(b) Works Needed

The only immediate need is to ensure that the community has adequate water supply. This may require servicing of the existing wells, or adding a third well for backup within 5 years.

(c) Time frame and Costs

Project	Year	Cost
Water Supply Upgrade	2002-2003	$30,000

12. La Loche

(a) Existing Situation

La Loche has two separate water systems. The main part of town has a conventional water system, while Poplar Point has a separate, small diameter water system.

There are a number of houses in the community not connected to the municipal system (Other Village as well as squatter houses). Many people use the raw lake water.

The water storage capacity at the Poplar Point WTP is below current requirements. Water distribution pumping capacity also needs to be expanded to meet current needs at both WTPs. Water supply in the main system will need to be upgraded within the next five years along with storage capacity at the main WTP.

Water heaters for the distribution system don't work which increases the risk of freezing of the mains in winter.

The 100 mm water mains at Poplar Point do not have the capacity to provide for fire protection. In addition, the WTP does not have sufficient storage for fire fighting or emergency backup.

SPS #1A needs expansion to handle current loads.

The lagoon storage cell is too small for the current population and the treatment cell will need expansion in 5 years.

(b) Works Needed

Water distribution pumping capacity needs to be upgraded to meet current demand.

SPS 1A needs to be upgraded fairly soon, as does the capacity of the sewage lagoon storage cell.

Expansion of the water supply and water storage capacity also needs to be considered in the near future.

The sewage lagoon treatment cell needs enlarging.

(c) Time frame and Costs

Project	Year	Cost
Water distribution pumping	2000-2001	$25,000
Water storage expansion (WTP 3)	2001-2002	$75,000
Sewage lagoon storage cell	2001-2002	$20,000
Water supply improvements	2003-2004	$40,000
SPS upgrades	2003-2004	$200,000
Water storage expansion (WTP 1)	2003-2004	$325,000

13. La Ronge

(a) Existing Situation

Water supply is good for the next 20 years. With completion of the new water treatment plant in 1999, treatment capacity will also be adequate for the period of study. Storage capacity however, needs expansion.

Distribution and storage capacity at the booster station is significantly under capacity, and needs to be upgraded.

There are concerns about the capacity of the water mains in some areas of the town. Additional information needs to be collected on the distribution system to determine what improvements may be needed.

The town has 11 SPSs, most which have adequate capacity, but are in need of repairs. However, SPS 4 is at capacity and requires expansion to handle existing loads. Additional information on the sewage collection system is needed to determine future needs.

The town's sewage treatment plant also requires expansion to handle current loads.

(b) Works Needed

The most critical need appears to be upgrading the distribution and storage capacity of a water booster station since this facility services most of the new residential development in the town.

Improvements to SPS 4 and the sewage treatment plant also appear to be needed in the short-term.

Studies of the water and sewer systems can also be undertaken to determine what needs to be improved. The results of the studies may indicate additional costs for main replacement or improvements over the next number of years.

Ongoing maintenance and repairs of the other SPSs should be undertaken as well.

(c) Time frame and Costs

Project	Year	Cost
Booster station expansion (pumping and water storage)	2000-2001	$1,700,000
Water storage expansion (WTP 1)	2001-2002	$250,000
Water system study	2001-2002	$50,000
Sewer system study	2001-2002	$30,000
Sewage treatment plant expansion	2002-2003	$650,000
SPS expansion/upgrades	2002-2003	$300,000
Water main improvements (1)	2002-2003	$250,000
Sewer main improvements (1)	2002-2003	$500,000
SPS upgrades (stage 2)	2003-2004	$500,000

(1) Depending on results of study.

14. Michel Village

(a) Existing Situation

The community's water and sewer system has adequate capacity for the next 20 years. Some maintenance and repairs are needed to keep the system functioning properly. A major cost would be the provision of backup power supply for emergency pumping capacity. There are concerns about the dependability of the power supply to the community. The water mains in Michel Village are 100 mm lines.

(b) Works Needed

Most work required at the present time, other than installation of a standby pump or generator at the SPS, is general maintenance and repairs to the existing equipment.

Two additional fire hydrants should be added to the system for full protection.

(c) Time frame and Costs

Project	Year	Cost
Standby/Fire Pump	2002-2003	$75,000
Water supply repairs	2002-2003	$500
WTP calibration	2002-2003	$10,000
SPS repairs	2002-2003	$1,000
Repairs to lagoon	2002-2003	$1,000
Service Distribution pumps	2002-2003	$500

15. Missinipe

(a) Existing Situation

The Hamlet's water and sewer system is in good condition for the 20 year period. Improvements can be made by adding a standby/fire pump to the WTP and upgrading the pump capacity at the SPS. Overhaul of the intake pump may be needed at year 10. The lagoon may need upgrading within 10 years along with pump overhauls at the WTP.

(b) Works Needed

No work is needed within the short term. However additional pumps should be added to the water system (standby/fire pump) and a backup pump added to the SPS.

(c) Time frame and Costs

Project	Year	Cost
Standby/Fire Pump	2004-2005	$80,000
SPS backup pump	2004-2005	$50,000

16. Patuanak

(a) Existing Situation

The system was installed in 1992 and is in good condition with adequate capacity for current needs. The water distribution pump may need upgrading in 5 years by adding larger pumps or a third pump. The major current item is the installation of a standby/fire pump to the water system.

The reservoir storage capacity is adequate for domestic use for 20 years, but is not capable of providing fire flows.

The sewage system has adequate capacity for the 20 year period.

(b) Works Needed

Repairs and maintenance to water treatment plant are required.

Funding for a Standby/Fire Pump was allocated in 1999-2000.

Service wells and WTP pumps are required.

(c) Time frame and Costs

Project	Year	Cost
Emergency/Fire Pump	1999-2000	$80,000 (paid)
Water Treatment Plant repairs	2002-2003	$5,000
Well Services	2004-2005	$10,000
Water Distribution Pumps	2004-2005	$5,000

17. Pelican Narrows

(a) Existing Situation

The existing joint system (with PBCN reserve) has adequate capacity for the next 5 to 10 years. At that point upgrading may be needed at the WTP, including intake, pumping and storage. SPS improvements at SPSs 2 and 4 may be needed as well.

A further study is needed to determine actual distribution needs, as this will be affected by the direction of future growth. Most of the municipality has moved to TLE reserve status.

(b) Works Needed

Further study into possible needs of a system based on community growth.

(c) Time frame and Costs

Project	Year	Cost	Provincial/municipal Share (estimate)
Water Distribution Study	2002-2003	$30,000	$1,500
SPS upgrades	2004-2005	$300,000	$15,000

18. Pinehouse

(a) Existing Situation

A large number of the components of the community's water and sewer system are below the current needed capacity. Water distribution pumping capacity can't provide adequate pressure. Storage capacity is below requirements and contributes to problems meeting demand.

Expansion at the lagoon was approved in 1998-99, with $253,000 funding made available in 1999-2000. The standby/fire pump is rated as having adequate capacity but the actual capacity may be reduced by age and wear.

Both the treatment and storage cell at the lagoon are undersized for the current population.

Improvements and repairs at the SPSs such as swab launch equipment, and other repairs are needed. Longer term work may require installation of larger sewer mains and upgrading of the SPSs.

(b) Works Needed

Upgrade water distribution and storage.

Water treatment capacity expansion and distribution pumping are required.

(c) Time frame and Costs

Project	Year	Cost
Lagoon expansion	2001-2002	$253,000
Water storage	1999-2000	$450,000
Water distribution pumping	2001-2002	$107,000
WTP capacity expansion	2004-2005	$900,000

19. Sandy Bay

(a) Existing Situation

The system has adequate capacity for the next five years.

At that time the WTP will need expansion including distribution pumping, storage capacity and installation of larger distribution mains in some areas. Significant upgrades will be needed in 10 years based on current population growth.

There are some concerns about the fluctuating water levels in the Churchill River affecting the intake, and improvements may be needed to ensure adequate supply.

The sewage lagoon is in good condition for the next 5 years, but will need upgrading at that point.

Improvements can be made at SPS 1 and 2 by adding swab launches, however they have adequate capacity for 15 years.

Large parts of the community are affected by TLE reserve proposals and the system will likely become a joint system in the near future.

(b) Works Needed

No immediate works are needed to meet current demand. Major improvements to the water system will be needed in around five years.

(c) Time frame and Costs

Project	Year	Cost	Provincial/municipal Share (estimate)o
Water distribution pumping	2004-2005	$50,000	$35,000
Water main upgrades	2004-2005	$100,000	$70,000
Water storage expansion	2004-2005	$200,000	$140,000

1 Based on current TLE reserve population, but the municipal portion may decrease as the TLE reserve in Sandy Bay expands.

20. St. George's Hill

(a) Existing Situation

The high manganese content in the treated water raises concerns about the operation of the filters in the WTP. These need to be examined in more detail and may need possible replacement.

The system has adequate capacity for the next five years. At that point water storage capacity and the sewage treatment cell will need expansion.

At the current time, servicing and maintenance may be needed for the wells and reservoir.

There is no standby/fire pump in the water system, however distribution lines are only 100 mm.

(b) Works Needed

Addition of a standby/fire pump.

Water filter/treatment study and filter replacement.

Well servicing.

(c) Time frame and Costs

Project	Year	Cost
Standby/Fire Pump	2001-2002	$75,000
Water treatment filter study	2002-2003	$10,000
Service wells	2004-2005	$10,000
Upgrade WTP filters	2004-2005	$20,000

21. Stanley Mission

(a) Existing Situation

The system is operated by the adjoining Stanley Reserve, with the settlement paying monthly service charges to the band. Most of the system has adequate capacity for the next 10 to 20 years, except for the water distribution pumping which needs expansion to meet current levels of demand. Major expansion of the water treatment plant may be needed in 20 years.

Expansion of SPS #1 and the lagoon treatment cell will be needed in around 10 years. The lagoon storage cell appears undersized, but no problems have been experienced due to infiltration and evaporation.

Power surges have damaged the WTP panels. There is some corrosion on boilers and there is no fire extinguisher.

(b) Works Needed

Water distribution pumping expansion.

(c) Time frame and Costs

Project	Year	Cost	Provincial/Municipal Share (estimate)
Water distribution pumping	2001-2002	$100,000	$11,000

22. Timber Bay

(a) Existing Situation

Timber Bay's system has adequate capacity to meet current needs. Some repairs are needed, including servicing one intake pump at the well and one distribution pump. A standby/fire pump and 25 hydrants are also needed for backup service and fire protection. A program for regular maintenance is recommended. There are complaints about the water being hard.

Timber Bay has a low pressure sewer system. There are problems with grinder pumps due to materials being placed in the sewers.

The lagoon site does not have gate or warning signs. The storage cell will reach capacity in around 5 years.

(b) Works Needed

Service the water intake and distribution pumps.

Addition of a standby/fire pump.

Lagoon expansion in future.

(c) Time frame and Costs

Project	Year	Cost
Well servicing	2002-2003	$30,000
Standby/Fire pump	2004-2005	$180,000

23. Turnor Lake

(a) Existing Situation

Turnor Lake has a joint system with the adjoining reserve. The system was initially installed in 1978, and extended to the reserve in 1983. Upgrades were added in 1990 and 1996.

Water supply is adequate for 20 years, but distribution pumping and storage capacity do not meet current demand.

In addition, repairs are needed at the WTP on the chemical feed pumps and filter piping. One distribution pump is out of service.

Iron and manganese content is above guidelines.

Further study is needed of the sewage lagoon as it appears it may be under capacity and may be leaking. Loading from the fish plant is unknown at present.

Immediate repairs are needed to the SPS. One pump is out of service and the automatic standby is not working. The condition of the valves and piping is poor with some leaks. The sewage force main had a number of leaks at startup and may need to be tested to ensure tightness.

(b) Works Needed

Water distribution pumping and storage needs to repaired and serviced.

A study of the lagoon is needed to determine future needs.

SPS repairs are required.

(c) Time frame and Costs

Project	Year	Cost	Provincial/Municipal Share (estimate)
Distribution pump upgrade	2000-2001	$10,000	$6,000
Water Storage expansion	2001-2002	$150,000	$90,000
SPS repairs	2002-2003	$205,000	$123,000
Lagoon Study	2002-2003	$25,000	$15,000
WTP repairs	2002-2003	$30,000	$18,000

24. Uranium City

(a) Existing Situation

Uranium City's system was initially installed in the 1950s. The community's population has declined dramatically from the design population so most of the system is oversized for the current population. The main concern is the age and size of some parts of the system. Parts are hard to find for the older equipment. In addition, operating costs are higher than they should be because the equipment is oversized. One example is the boiler at the WTP. Currently one is out of commission so there is no backup.

The report suggests the water distribution system should be studied in more detail to determine if a more cost effective design can be put in place. Pumps are aging and may need major repairs.

(b) Works Needed

Boiler replacement is required at the WTP in order to reduce annual O&M costs.

A water distribution system study should be done to identify efficiencies.

Water distribution system improvements.

(c) Time frame and Costs

Project	Year	Cost
Boiler replacement	2001-2002	$200,000
Water system study	2002-2003	$15,000

25. Weyakwin

(a) Existing Situation

Weyakwin's system was installed in 1974 and has adequate capacity for at least the next 5 to 10 years. At that point the wells will be reaching life expectancy and need upgrading.

Manganese content in the water is above guidelines, but new filters are being installed in the WTP which should fix this.

The WTP building may need replacement in the next 5 to 10 years with filter upgrading by year 20. Water storage will need to be upgraded towards the end of the 20-year period.

The water distribution lines are only 100 mm and do not have fire flow capability. Heat tracing on these lines is nearing its life expectancy. If replaced, lines should be upgraded to 150 mm lines.

The standby/fire pump is below capacity.

Sewage collection is by clay tile pipe and the pipes may be near life expectancy.

There is no backup power supply at SPS. The plant is currently receiving upgrades to pumps, instrumentation and controls.

Sewage lagoon capacity is adequate for 10 years.

(b) Works Needed

No works are noted as being required within the next 5 years.

(c) Time frame and Costs

Project	Year	Cost

26. Wollaston Lake

(a) Existing Situation

Wollaston Lake shares a system with the Hatchet Lake reserve. Very few houses in the Settlement are currently connected to the system, and this should be addressed. Hookup costs for the houses are not included in the cost estimates and would range between $8,000 and $10,000 per house due to the isolated location of the community. There are about 35 houses in the community, 11 of which are SHC units.

The system has adequate capacity for at least the next 10 years. However, the 100 mm water line in part of the community froze and, as a result, has a reduced life expectancy. When replaced, the mains should be upgraded to 150 mm line to allow for fire flow capacity.

The south part of the community does not have fire hydrants. Hydrant spacing in other areas is inadequate and four new hydrants are needed for proper protection.

Water supply and distribution pumping is adequate for 10 years, but the intake pump will need replacement in around five years.

Older parts of the sewer collection system are shallow and not insulated, but there have been no reports of freezing.

SPS #2 serves the settlement. Piping in the station has deteriorated, with missing safety shields on pumps, and a substandard electrical system. The station is nearing the end of its life expectancy and will need major upgrading or replacement within 5 years. The emergency power supply is a portable unit and must be moved to the SPS if power fails. An on site system is better.

Sewage effluent disposal is by infiltration through the lagoon storage cell floor.

(b) Works Needed

The water intake pump needs replacement.

Water mains should be upgraded to 150 mm lines.

SPS #2 upgrade.

WTP upgrade including storage capacity.

Sewage treatment cell expansion.

(c) Time frame and Costs

Project	Year	Cost	Provincial/Municipal Share (estimate)
Water main upgrade	2002-2003	$200,000	$200,000
Intake pump replacement	2004-2005	$100,000	$12,000
SPS upgrade	2004-2005	$250,000	$30,000

Appendix 2 - Alternative Systems

As part of the study the consultant was asked to evaluate optional methods of providing water and sewer services to the unserviced communities. The evaluation was to consider both initial capital costs and long term O&M costs. The consultant considered five types of systems.

(1) Pail Fill and Pit Privy

This system is currently used in most unserviced communities. It provides a central well for water (or in some cases, surface water), that may include an electrical pump for pail fills. There is no water treatment. Homes usually have individual pit privies with surface disposal of grey water.

Construction costs for these systems are low (average $109,000 for a well and a pump). Total costs for all unserviced communities would be $875,000 for this type of system. Since most communities already have wells, the cost of continuing this system would be minimal.

O&M costs are low, averaging around $8,000 per year initially, primarily for electricity to operate the pumps.

This system provides minimal, basic service and has the highest health risk due to possible contamination of water supplies from the pit privies. In addition, since many northern communities are near surface water bodies, continued use of pit privies and surface disposal of wastes also poses risks for contamination (and as such would not comply with provincial regulations). Some communities do not have sewage lagoons and there is no place to dispose of sewage in a proper manner. The system does not provide for fire protection or emergency water supply.

(2) Truck Haul of Water and Sewer

This system requires each house to have two holding tanks (one for water, one for sewage). As a minimum, tank sizes should be 4500 *l* (1250 US gal). Each cistern requires a pump to supply water to the house. Two trucks are required, one for hauling water and one for sewer. A suitable source of drinking water is needed along with a suitable method of sewage disposal (such as a lagoon).

Costs range between $580,000 and $2,200,000 for initial installation of this system (average cost $950,000). The costs assume that the municipality will be responsible for purchasing and installing the holding tanks for the households.

Trucking costs can range from $200 to $400 per month per household depending on water use. Individuals are responsible for the costs of operating cistern pumps and any heat tracing for water lines. The number of households in the community would affect the long term O&M costs. Estimated initial average O&M costs are around $123,000 per community per year, based on the community paying the trucking costs.

Capital costs for some communities also include the municipality buying the hauling trucks as well as operating and maintaining the vehicles. Additional annual capital costs for tanks and pumps would occur when new houses were constructed in the community. Initial capital costs would be reduced if each household purchased its own tanks, but this

may not be economically feasible. In addition, a private individual could operate the hauling business, either on a fee for service basis or on a contract with the municipality. This would reduce initial capital costs but may increase long range O&M costs.

Fire protection and emergency water supply is not available with this system.

(3) Low Pressure Water with Holding Tanks

This system is useful in areas with scattered houses. The system requires a central water source, such as a well, with a treatment plant. In some cases, provision may be needed for backwashing (a sewage pumping station and force main) where water filters are needed.

A small diameter (25 to 100 mm) water pipe with maximum water delivery capacity of 0.063 litres per second, runs from the treatment plant to each house. Water is stored at the house in a cistern (holding tank). Each house has its own pump for domestic pressure.

Sewage disposal is by individual holding tanks that are pumped out. An acceptable method of sewage disposal (such as a lagoon) is needed, as well as a truck to haul the sewage.

Capital costs range from $640,000 to $3,020,000 (average $1.2 million)

O&M costs relate to water treatment plant maintenance and trucking of sewage. Individuals are responsible for maintenance of cistern pumps and heat tracing. Estimated initial average annual O&M costs are around $105,000 per community.

Capital costs in some cases include the purchase of cisterns, septic tanks and a sewage hauling truck by the municipality. The capital costs will be affected by the number of service connections that the system needs. Additional annual capital costs could be expected for cisterns and holding tanks when new houses are constructed in the community. Initial installation costs would be reduced if individual homeowners purchased the tanks. In addition, a private individual could operate the hauling business, either on a fee for service basis or on a contract with the municipality. This would reduce initial capital costs but may increase long range O&M costs.

(4) Small Diameter Water and Low Pressure Sewer

The system requires a central water source, such as a well, with a treatment plant. In some cases, provision may be needed for backwashing where filters are used. Water is distributed, under pressure, to the buildings by a small diameter water distribution line (50 mm). The system does not have adequate capacity for fire protection. In northern climates the water lines would likely have to be heated (heat traced) at $30 per metre. Life of the heat trace is around 25 years (shorter than the life of the pipe).

Sewage is also pumped through a small diameter (50 mm) line under pressure from individual pumps at each building. Each house requires a two-compartment septic tank with a pump (grinder pump or effluent pump) to force the sewage through the lines. An acceptable method of sewage disposal and treatment (such as a lagoon) is needed.

Capital costs range from $820,000 to $3,400,000 (average $1.4 million) and include the cost of the septic holding tank, but not the pumps.

Annual O&M costs are mainly for water treatment plant operation. Estimated initial average O&M costs are around $100,000 per community per year. In addition, individuals are responsible for costs relating to maintaining the pumps and periodic cleaning of the septic tanks.

(5) Conventional System

Raw water supply must provide average daily demand while intake and treatment units must meet peak daily demand. Distribution pumps must supply peak hour demands. Storage requirements are 2 times average daily consumption. Backup and emergency pumps are usually installed in the treatment plant. Distribution to houses is by 150 mm diameter mains which includes hydrants for fire protection

Most common systems provide 200 mm sewer mains with regularly spaced manholes for household hookups. The system also requires sewage pumping stations and force mains. The number of stations depends on the topography of the community.

Installation costs range from $920,000 to $3,400,000 (average $1.6 million)

O&M costs are related to operation of the water treatment plant. Estimated initial average O&M costs are around $66,000 per community per year.

(6) Systems Recommendation

The consultant has recommended that conventional water and sewer systems be installed in all communities except Bear Creek. The conventional system meets provincial standards and guidelines. However, based on population, future development and local needs and expectations, one of the other alternatives may be a better choice. In addition, the potential for phasing of development of the system can be considered. For example, a truck haul system could be upgraded to a low-pressure water and sewer system.

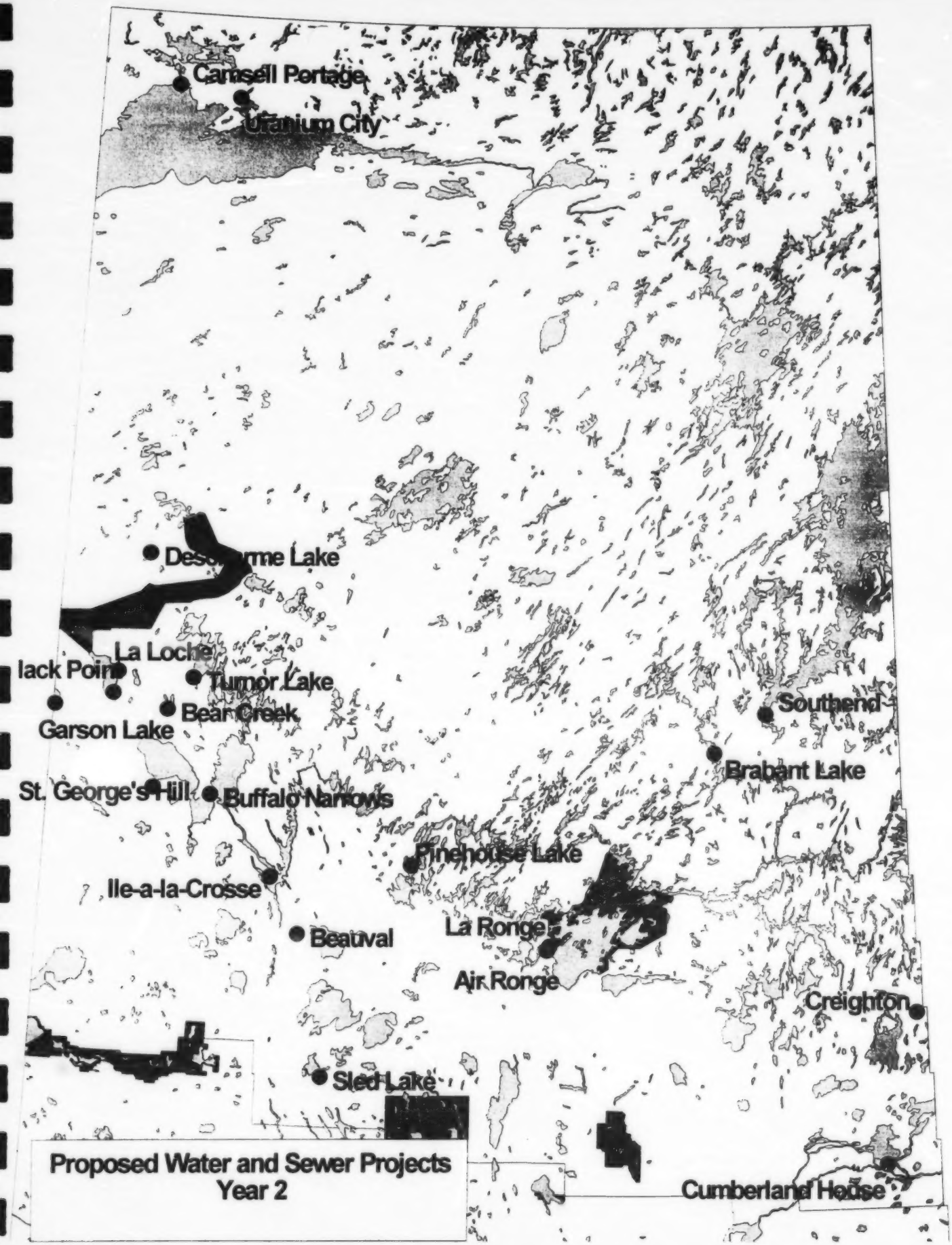
Water storage ranks high in priority for most of the unserviced communities since there is currently no storage capacity. However, since this is mainly intended for emergency use such as municipal fire fighting, the relative importance of storage in relation to other components, such as water supply, may not be as critical. In addition, where treatment plants are needed, the storage reservoir will be a component of the treatment system.

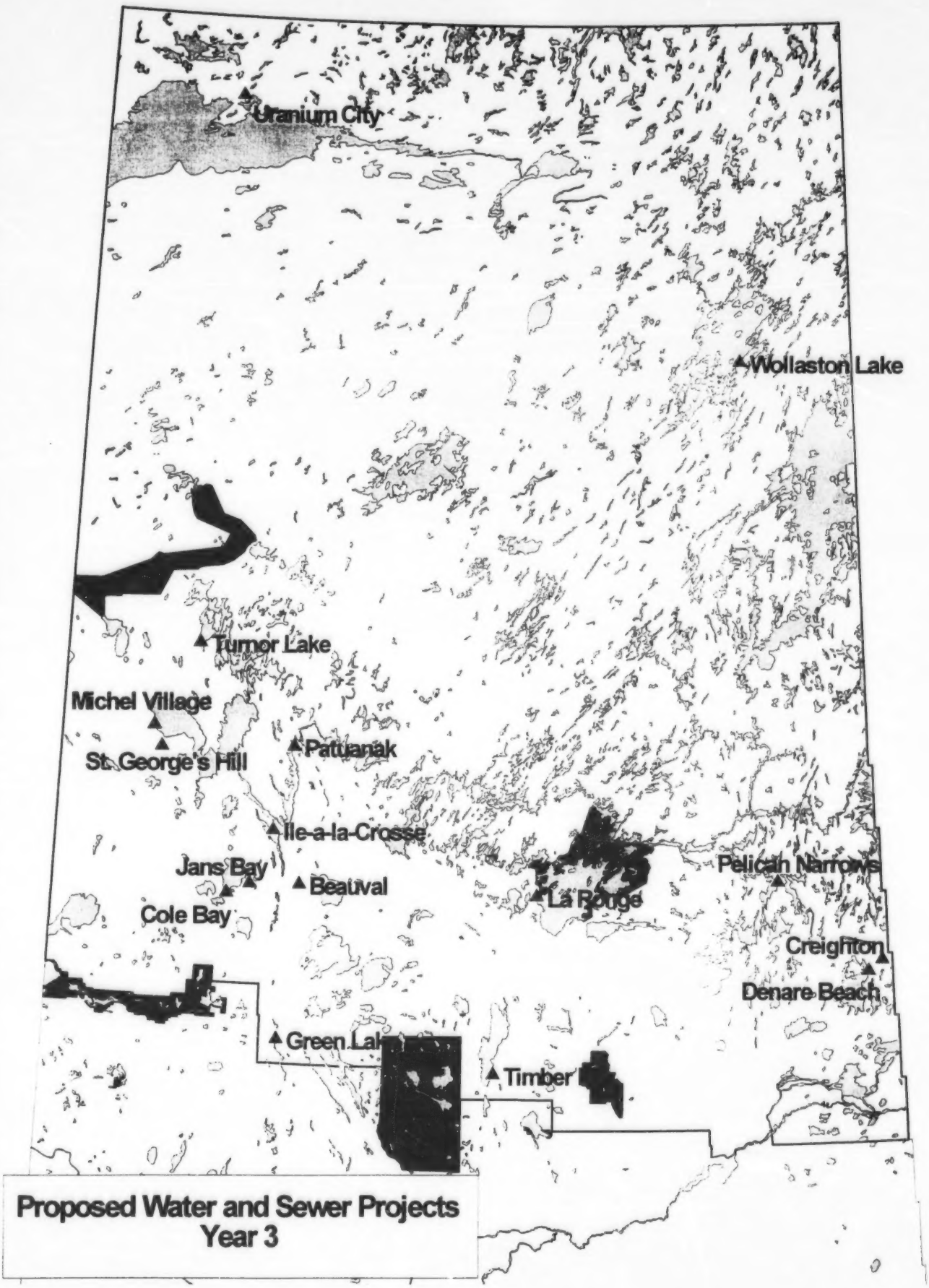
The relative importance of a fire protection service in the community will affect the type of water and sewer system. Options to providing adequate fire protection can be considered.

Water - A secure source of potable drinking water is the highest priority in order to maintain the health of the residents. Most communities have a well or surface water intake with some treatment except for Camsell Portage and Brabant Lake. Stony Rapids has a surface water intake and treatment but serving a very limited part of the community. Quality also varies, generally depending on the source since few of the communities provide any treatment. Surface water sources tend to need more treatment than ground water sources. Distribution is mainly by pail fill or truck delivery, although Sled Lake has a small diameter piped system with very limited capacity, and the Stony Rapids system serves a limited area. As noted, none of the communities have any water storage capacity.

Sanitary Sewage - Stony Rapids, Brabant Lake and Sled Lake have lagoons. Southend has access to the Band Lagoon. None of the other communities have any easy access to disposal and treatment facilities. None have a piped collection system.

Camsell Portage
Stony Rapids
Deschambeault Lake
La Loche
Turnor Lake
Black Point
Brabant Lake
Ile-a-la-Crosse
Stanley Mission
La Ronge
Creighton
Sled Lake
Green Lake
Cumberland House
Proposed Water and Sewer Projects
Year 1


Camsell Portage
Uranium City
Garson Lake
Bear Creek
Tumor Lake
La Loche
St. George's Hill
Buffalo Narrows
Ile-a-la-Crosse
Beauval
Pinehouse Lake
La Ronge
Air Ronge
Southend
Brabant Lake
Creighton
Sled Lake
Cumberland House
Proposed Water and Sewer Projects
Year 2


Uranium City
Wollaston Lake
Turnor Lake
Michel Village
St. George's Hill
Patuanak
Ile-a-la-Crosse
Jans Bay
Beauval
Cole Bay
La Ronge
Pelican Narrows
Creighton
Denare Beach
Green Lake
Timber
Proposed Water and Sewer Projects
Year 3

La Loche
Ile-a-la-Crosse
Cole Bay
La Ronge
Air Ronge
Creighton
Proposed Water and Sewer Projects
Year 4

Wollaston Lake
St. George's Hill
Patuanak
Buffalo Narrows
Pinehouse Lake
Missinippe
Sandy Bay
Pelican Narrows
Dore Lake
Denare Beach
Green Lake
Timber Bay
Proposed Water and Sewer Projects
Year 5